

RECORD

Book #73

1952-1953

Collection and Field Notes Book

Vol. 13

(May 10, 1952 - May 10, 1953)

(45212 - 45213)

1952

Apr. trip New York to Caracas.....

1953

Jan. 10 - 1953.....

Jan. 11 - 1953.....

Jan. 12 - 1953.....

Jan. 13 - 1953.....

Jan. 14 - 1953.....

Jan. 15 - 1953.....

Jan. 16 - 1953.....

Jan. 17 - 1953.....

Jan. 18 - 1953.....

Jan. 19 - 1953.....

Jan. 20 - 1953.....

Jan. 21 - 1953.....

Jan. 22 - 1953.....

Jan. 23 - 1953.....

Jan. 24 - 1953.....

Jan. 25 - 1953.....

Jan. 26 - 1953.....

Jan. 27 - 1953.....

Jan. 28 - 1953.....

Jan. 29 - 1953.....

Jan. 30 - 1953.....

Jan. 31 - 1953.....

Feb. 1 - 1953.....

Feb. 2 - 1953.....

Feb. 3 - 1953.....

Feb. 4 - 1953.....

Feb. 5 - 1953.....

Feb. 6 - 1953.....

Feb. 7 - 1953.....

Feb. 8 - 1953.....

Feb. 9 - 1953.....

Feb. 10 - 1953.....

Collection and Field Note Book

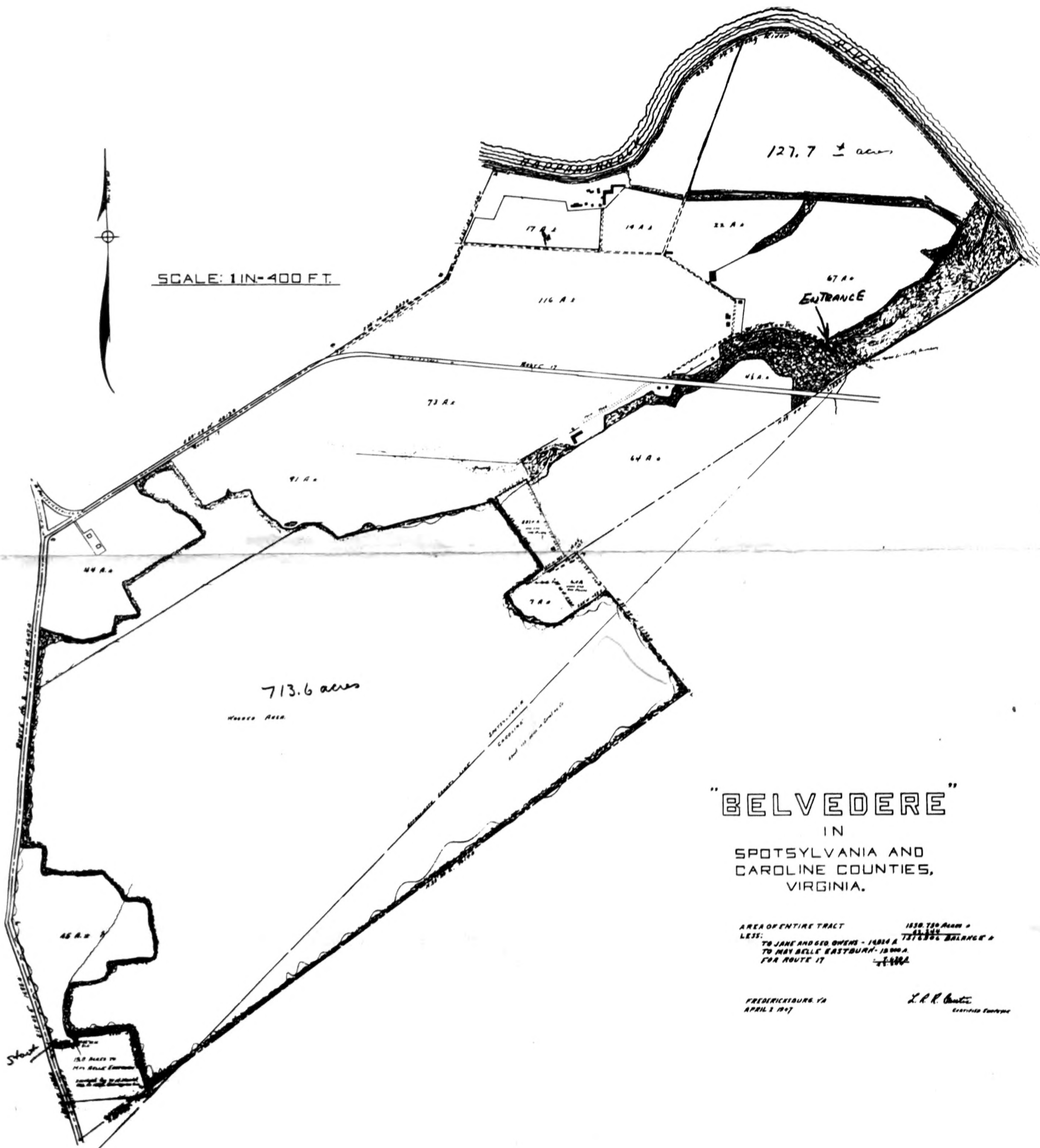
No. 73

(May 10, 1964 - July 19, 1964)

(45215 - 45683)

	Pages
Air trip New York to Caracas.....	1
<u>Venezuela</u>	2-105
Caracas to Maracay.....	2-4
Short trip by auto into hills- Villa de Cura.....	5
Bus trip to Puerto Perito....	7-11
Specimens collected	
East of San Sebastian.....	12-13
Puerto Piritu.....	12-13
Trip by bus out of Jusepin.....	22-41
Specimens collected	
Southeast of Maturin.....	42-43
South of Rio Tigre.....	42-45
Between Rio Tigre and Rio Guanipa	44-49 45237-45254
West of Punto de Mata.....	48-49
La Ceiba	48-49
Between La Ceiba and Santa Rosa	50-51 45262-45265
North of El Tigre	50-53
West of El Tigre	52-53
Bus trip San Torne - El Tigre.....	54-69
Specimens collected	
West of Pariaguan.....	70-71
East of Taguapire.....	70-71
West of Chaguaramas	70-71
Northeast of Calabozo	72-73
Projecto Guarico	72-73
Bus trip Calabozo south to San Fernando de Apeue.....	74-84

	Pages
Specimens collected	
South of Projecto Guarico.....	86-87
Camaguan.....	86-87
La Guama.....	88-89
Estacion Biologica de la Sociedad de Historie Naturel de Venezuela.....	90-93
Bus trip Calabozo to Maracay 5/19.....	94-100
Specimens collected	
Estacion Biologica Reserve near Calabozo..	102-105
Puerto Rico.....	106
(Air trip Caracas to New York)	
<u>Virginia</u>	
Alexander Berger Memorial Sanctuary.....	110-115
Specimens collected	
<u>Virginia</u>	
Fairfax county.....	108-109
(Great Falls, Sleepy Hollow).....	184-185
Spottsylvania County.....	116-127
Shenandoah National Park	130-151
Frederick County.....	170-173
Pennsylvania (Trip 152-156).....	176-183
South of Berlin.....	158-163
<u>Maryland</u>	
Garrett County.....	166-167
(Finzel Swamp)	166-169
District of Columbia (Smithsonian).....	128-129
Virginia -- Alexander Berger Mem. Sanctuary..	110-115



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1

May 10 - Airtel N.Y. to
Caracas.

left 4:30 p.m. Convair 440 left side.
at 7:00 p.m. two rather small
islands - rather triangular
in shape, largely scrub-
covered, but with fairly
large bauxite, neither
one with a small lagoon
in its north end, appear
very flat. Not very green.

715 Hispaniola - but
visibility very poor.

May 12 - Caracas

Mangifera indica
Euphorbia cotinifolia
Sansevieria zeylanica
Euphorbia pulcherrima
E. tirucalli

May 12 - Caracas to Maracay
by bus.

Just out of Caracas the hills are covered by small houses, some trees and other plants among them. Upper parts of higher hills brush-covered.

First hills are covered by a deciduous thorn scrub with a very liberal scattering of green *Fouquieria* and *Agave*. A few green bushes. The *Fouquieria* and *Agave* very soon disappear or become scarce. Vines abundant. Hills are formed of thinly bedded shales or schists, very much distorted.

As we climb, the scrub becomes greener. Near summit a degraded evergreen ~~for~~ scrub forest. Summit ridges a mixture of low shrubs and *Pteridium*, some *Gleichenia*. Top area appears to have been burned and is almost continuous *Pteridium*.

Some new burn scars on upper w. slope. On this slope some ridges are grassy. *Melvinia*,

wigandia on rocky cuts.

On this slope the evergreen belt is less developed, mostly in ravines. Much more burning here.

P

2 BW photos of a very degraded hill with *Pteridium* & scattered bushes near La Teques.

Beyond here the hills are extremely denuded and much burned over. Only scattered patches of woody vegetation.

Cissampelos very common in wooded patches.

A little farther down the woody vegetation becomes deciduous. The cover becomes more abundant, but is spiny & microphyllous. A thorn scrub forest. Some large patches of grass. Lower hills a patchwork of shifting cult. and thorn forest. In valley bottoms *Lamanea*, etc. and cane fields. Some *Guadua*. Hills are more and more covered with thorn forest, little clearing.

P

Photos in valley bottom of cane field and thorn forest on hills.

On lowest hills is
Curatella savanna -
Curatella shrubs or
small trees more or less
evenly spaced, in place,
almost close enough to be
called open scrub. The
grass between is burned
down to basal tufts.

P Much soil showing.
One photo from bus.

Here the savanna can
scarcely be due to impeded
drainage, as slopes are
up to 45°.

Flat plain is largely
cultivated - banana, etc.
around periphery, cane
more common toward interior.
Scattered large trees,
mostly bananae.

Trees & Guadua more
abundant along field
boundaries.

Some large areas
evidently too dry for cultiva-
tion - not suitable for irriga-
tion, with sparse coarse
grass and ~~scattered~~ scattered
large bananae, locally
close enough together to be
called forest, mostly must
be called savanna.

This part outside Maracay.

May 14 - short auto
trip up into hills on
road to

Hills completely denuded
except for thin strips of ~~forest~~
evergreen forest
in ravine bottoms
otherwise covered with
a savanna vegetation
of Curatella, Byrsonima,
etc. widely spaced,
with a ground layer
of Melinis. The bushes
become more sparse on
upper slopes.

The road goes up from
Maracay over an alluvial
fan of great boulders.
The hills are granite.
In the main ravine the
prominent tree is Anacardium
excellsum. Mangifera
common, also.

Lower hills heavily
grazed, covered by scattered
trees, a few cacti. Thickets
in ravines. Tree mostly
green. In places lower
story is grass, in places
a more or less microphyllous
scrub.

This ground
mostly

Villa de Cura -
grazing pattern very conspicuous
on hills. Shrub savanna.

May 14 - trip by bus
to Puerto Paríto.

Lago de Valencia - very
narrow marshy fringe
with grass and *Eichhornia*, etc.
No tall emergent plants.
Some plantations of
Musa nana, some sugar
cane. As we approach
hills the ground slopes
up slightly. Pasture with
scattered trees. Many
hamanas. Roadsides
lined with trees & shrubs.

(Invert from p. 5)

Beyond Villa de Cura,
is a pass through the
mts. Flat bottomed
valley. Scattered large
trees. Some ~~small~~ bottle
trunks. Road lined
mostly ~~with~~ with
Glericidia sepium.
Hills become more
wooded, but ~~are~~ very
irregularly. Mosaic
of wood & savanna.

Then hills more and
more eroded, ~~over~~ overgrazed
and bare. Cultivation
and trees in valley bottom.
Dry in aspect.

Los Monos de San Juan
(San Juan de los Monos)
striking limestone
peaks. Dry savanna
on surrounding hills of
mica schist, severely
burned. Some fire scar.
5 photos of monos and
savanna covered hills.
Upper slopes, below cliffs, of
monos, forested.

Near San Juan the
savanna slopes are ~~less~~
more luxuriant, but
typical *Bassinia*-*Curatella*
savanna ^{savanna} thickets in
ravine bottom incl. large
trees. *Spondia*, *Anacardium*,
Mangifera, *Glericidia*,
Cecropia, *hamana*, etc.

At San Juan, turned
east in a large valley.
Some relief in bottom, this
covered by savanna. Flatter
places cult. Bananas,
mangoes, breadfruit.

Lower slopes with
savanna, thickets of
Acacia, other legumes,
Spondia, *Cecropia*, etc.
Much of this newly
burned. Erosion severe.

Then lower hills with
semi-deciduous scrub or
scrub forest or open scrubforest.

Shifting agriculture.

A limestone crest on left, very rugged, slopes above and below cliffs wooded.

Lower hills with a semi-open scrub forest, semi-deciduous, with Guazuma some cult.

Flat bottom burned or pastured, local patches cult. Whole aspect rather dry. Patches of tawny grass on hills, mostly wooded, though.

Creek with water.

(9, 25)

San Sebastian -

Then in rolling & hilly valley bottom a mosaic of savanna and deciduous or semi-deciduous scrub or scrub forest.

Murera, Acacia, Prosopis, etc. many species. many vines. Some hills very bare.

On flat in valley a sparse thorn scrub of Acacia spp. Here in thicket is Jatropha sp. (cf. caracas), Psidium sp.

Enterolobium

Then extensive savanna of Hybanthus mpa with scattered trees of various sizes and kinds.

Small incised stream. (near Granja Altigracia) just before fork in rd. San Casimiro left Altigracia rd. Some of this shows grass to 1-1.5 m. tall, other large areas burned gallery forest of many species of fairly large trees - Anacardium, Enterolobium, Guazuma, Samanea, Muntingia, Cecropia.

San Casimiro Rio Tuy - deep ravine, some flat ground on bottom.

Slopes denuded except for steep wooded ravine. Grazing pattern heavy. Much burning. Upper slopes and ridges without scattered shrubs, lower with them. Road follows ravine. Where ravine is narrow thickets, where broad cult. & clumps of Guadua. Cythrinus. Some Cynerium along stream and on a few wet slopes. Manioc & bananas cult. on slopes.

Hills are of schist. Now there are higher hills

that are wooded near
top. Coffee plantation
with native shade trees
in valley bottoms or
lower slopes. Much
banana cultivation.
Guadua locally abundant.
Lower hills with tall,
almost closed deciduous
scrub. Also badly burned locally.
Considerable area of this,
but with patches of grass.
In places grass covers most
of area, esp. on steep slopes.
Caratella with it locally.
Hills about 45°.

Now in drainage of Rio Tuy.
Deciduous scrub and scrub
forest.

Long nests hanging from
trees, made of huge thorns.
Gallery forest of large oaks
trees in ravines.

Muntingia common.

Coming out into very
broad valley. Hills have
deciduous forest with some
Cereus.

Cua.

Valley rolling and
largely cult. except
rougher spots. Scattered
trees and hedgerows
~~Charral~~.

about near
Ocumare del Tuy.
Savanna on rolling
stony ground. Thicket
in depression. Wider
depressions with cult.

San Francisco de Yare.

A large low flat
area of microphyllous
thorn forest. Flat-topped
Acacia. Rolling land
with very open scrub,
and some hills with low
deciduous forest in patches.
Some cultivated (fallow) or
bare pasture. Morrelia
in bare trees.

Then more relief and
hills mostly covered
by low deciduous forest.

On left a flat valley
bottom with cultivation.
Hills with deciduous
forest on other side.

Some savanna on
rolling ground. But
deciduous forest separates
from it by a fence.

Some low spots with
rather widely spaced
large spreading deciduous
trees.

Santa Teresa.
Crossed Rio Tuy.

May 14 - east of San Sebastian,
Est. Aragua

- in thorn scrub
 45⁵ 215 *Jatropha*
 1 thicket
 1 16 *Acacia macracantha* det Steyermark
 common
 2 17 *Acacia macracantha* "
 occasional

May 14 Puerto Piritu,
Est. Anzoategui
 on sand flats ~~is~~ along
 strand just back of beach.
 1 18 *Alternanthera*
 very common

- 1 19 *Calotropis procera* (L.) Ait. f. det
 common

shrub 4 m. tall, bark
 - thin, peeling, brownish.
 1980 - shrub 2 m. tall; flowers
 - orange yellow.
 - small tree 5 m. tall,

1 m.

very prostrate,
 forming loose mats,
 - glaucous.
 - shrub 1 m. tall,
 glaucous, flowers
 pale purplish.

Bottomland forest deciduous,
or semideciduous.

Then rather steep rugged
hills with deciduous
forest or dec. scrub, evergreen
forest in bottoms of deep
ravines, esp. along Rio Tuy.

Cedrela, Tabebuia, Hura,
Inga? Cecropia, Prosopis?,
are common trees. Guadua.

Hills are much burned,
some devoid of trees.

This more and more as
we go down river.

There has been no
Curatella savanna for
many miles, none here.
North hills are mostly
bare, grassy or the grass
usually burned off,
only a few ^{wide} scattered fairly
large trees, and thicket in
ravines. Some slumping on
steep slopes.

Crossed large tributary.

A few tiny patches of wood
left on hills, otherwise
few even scattered trees. Ochroma,
exactly in gallery along ravine.

NW, suddenly, the hills
are somewhat green, from
young growth of grass.
Here, at least, Panicum
maximum.

Slopes now with
green thicket. Much
Ochroma, Cecropia, Inga,
Verticillaria, forming a fairly
good secondary forest
with thick undergrowth -
Heliconia, Lantana, Piper,
Cupatimin of odoratum,
Vernonia?, Gleichenia (Krae)
Miconia, large aroid,
Miscanthus-like grass on
road cuts, Vismia, and some bromeliads.

Many vines ^{and some bromeliads} on larger
trees that are relic, of
older forest, not on the
Ochroma or Cecropia.
patches of Gynerium (must
indicate steep slope)

Parque nacional de Guatapé
summit - Los Alpes del Tuy.

Montane rain forest,
rather degraded, but
dense and luxuriant.
About 300 m.

I 20° rainfall \pm 30"

Down from here,
thick montane rainfall.
Much balsam on left slope,
less disturbed across
ravine on right.

Forest probably assuming
a more xerophytic aspect
as we go down, but Cecropia

and *Ocuma* remain common. Euterpe occasional. Many vines. Hills begin to be cleared and grassy.

Cross Rio Tuy.

Erythrina poeppigiana shading cacao & bananas.

Much *Quadrus*. Some other trees in shade, too.

Then irregular secondary forest in broad valley, alternating with banana patches with some shade. Then more or less grassy hills. Cacao plantations on flat ground. *Gynerium* brakes.

Out into rolling country partly in grass, patches of wood, thickets, cult. patches, patches of *Thalia geniculata*.

Crossed bridge to main highway.

Hills now dry & grassy. In Encarnada, near Cauagua.

Grassy hills with groves of Scheelea. Thickets with *Triplaris americana*. Hills become more and more wooded. Low rolling land

grassy with thickets and scattered trees. Hanging net of a *Coussia* covered with spines.

Hills farther west have many fires. Many burn scars along road and in nearby hills. Mixture of thickets and openings on rolling hills. *Gynerium* along stream and in wet spots. Some is burned. *Quadrus* also.

Bardowicki was here 15 years ago and it was unbroken rain forest. Now completely degraded. - some cacao 80-90" rainfall.

Road to Higuerote to left.

Casearia. *Pithecellobium dulce*. *Tabebuia* cf. *pentaphylla* (in fl.) as cacao shade. Much cacao here. Bananas, also.

To east on coastal plain degraded vegetation. cult. patches bananas, cacao, swamps with *Gynerium*, *Heliconia*, - more cacao than anything else.

Some coconuts. Much tangled thicket.

Citrus achardii.

San José de los Rios.

East on coastal plain
a complex of thickets, large
trees, patches of bananae,
swampy spots, patches
of secondary forest, some
coconut trees, etc. Roystonea
(apparently spontaneous)
Crossed river.

Then some open areas,
mostly growing up to
scrub of varying heights.
a little cult. some rather
big pastures, cacao
plantations. Guadua.
Gynerium. These line
watercourses. much
cacao locally breadfruit
& mangoes, some very
large. A yellow tatchia
& grape.

Forest increases in
proportion eastward, but
is being cleared rapidly.
Cecropia abundant
along road. Mostly
secondary, bushy. Some
degraded primary. Scheelea
common, also Triplaris.
Every stage of degrada-
tion. Heliconia locally one
of dominants.

Then country becomes
more dissected, but not
higher. Veg. is an open

deciduous or semi-deciduous
forest with a closed
tangled understory.

Then a very large, flat
savanna of ^{bluish} grass
and scattered large
trees, partly evergreen
(Curatella), partly deciduous
(Xylocarpus).

Then hills with
deciduous forest. Burrens, etc.

Crossed river. No more.
Dry wooded hill out.
savanna on left, middle
Then ~~up~~ but distant
and apparently for a
coconut plantation.

Then hills and
flat covered by deciduous
scrub forest, very white
tangled, somewhat spiny,
some arborescent cacti,
Bromeliads on ground, some
Tillandsia usneoides on
some trees. Photos of
general aspect and close
up (low); on coast ~~not~~
bet. Cupira and Boca de
Uchire. Prosopis, Caesalpinia
coriaria (divi-divi) with
spiral pods, Pereskia,
Prosopis largely dominant.
Cacti, esp. Opuntia, more
abundant eastward. A low

arched, glaucous species of *Cupressus* with narrow joints common in openings on bare ground.

Around large lagoon a broad zone with no vegetation. Around this a narrow to broad belt of *Batis*. In this some scattered *Avicennia*. Locally *Cereus* sp. (columnar) growing in *Batis* flat!

The *Avicennia* is outside the bare zone.

Turned inland into high hills covered with the same forest.

The Brazilians say this white forest looks like caatinga of NE Brazil.

On the other slope of the hilly stretch the forest becomes more or less green, taller, more winged. Perhaps a semi-deciduous scrub forest.

At the base, on flat country, deciduous scrub forest again.

This extends for some distance, mostly over low hills. Trees generally white to gray. Locally

green where *Prosopis* dominates, but this is largely along the road where a broad strip has been cleared. Scattered green trees in the main body of the forest.

Large flat area, still dominated by this same forest, but with perhaps more evergreen trees scattered in it. Occasional large areas cleared.

Calotropis common on bare cut, and banks along road and pipe line. Turn-off to Puerto Piritu.

Strand at Puerto Piritu - a sand flat behind a very slight beach ridge of quartz sand, fine. Few plants:

Alternanthera

Calotropis

Cynodon dactylon

Tribulus terrestris

Boerhaavia cf. *repens*

Prosopis cf. *juliflora* (prostrate)

Thespesia populnea (planted)

May 15 - trip by bus out of Jusepin.

Savanna in immediate area of Jusepin has scattered shrubs but few trees, grass grazed short, but closed. Distribution of shrubs very uneven, becoming more conspicuously spotted as we progress - the spots becoming open scrub in places.

Broad ravine of Rio Guarapiché wooded with a complex of thickets of mostly deciduous (perhaps about 70-75%) trees & shrubs, and savanna and open scrub patches. A slender upright bamboo is very common - clumped.

Followed this river valley for a time - to La Toscana.

There are various small farms in the ravine and outskirts of La T.

Beyond La T. veg. varies from grassland with scattered shrubs to open scrub and thickets. Many small farms along road. Gallery forest along watercourses & ravines. Considerable evidence of burning, some recent.

Then considerable open plains.

Jusepin, Mon.

Turned right at Hotel La Encarnación, to go south, through plains with low grass (grazed) and a few scattered shrubs. Then a settled area near a river. In this ravine a gravel pit shows cross-bedded gravel under a thick layer of fine sand and silt which is red below, shading to yellow gray and gray above - the gray color perhaps due to charcoal. In places overlain by red gravel possibly artificially placed there. Lat. soil. 1:0-1. This is obviously a relatively recent terrace deposit compared with the "Upper llanos" surface on both sides. It has come about under sufficiently pluvial conditions to get a typical terrace deposit, gravel below and fine above, and long enough ago to have a soil development: blackish to gray to yellow gray to massive red (silty sand) (to bedded gravel).

This broad river ravine covered by farms and degraded forest.

Town of Maturín just south of river, ravine or plain.

South a mile or so, in a vast plain with no trees
 (300-1400 mm. per. strongly seasonal)
 (May) June - Aug. most rainy
 dry period Sept. - ~~Oct.~~, but
 some rain Sept - Jan.
 Water table shifts markedly.
 This is called part of
 Lower Sllanos. Organic
 matter disintegrates rapidly.

The area has been used
 for livestock for a long time.
 Soil fine, gray for 9-10 cm
 turning yellowish.

~~Heliconia~~ ^{Cyperus} Grass tufts 8-10 (10) cm
 apart, burned to within 3-5 cm
 of ground. This with little
 also forms matrix or background
 scattered anthills with
 or without tiny *Crematogaster*
 to 25 cm. tall. These
 bring up the yellow subsoil,
 as they are bright yellow.
 In this are spots of
 richer vegetation marked
 by *Hypochaeris* sp. and
Andropogon sp.

Profile ^{very} fine sand

A1 gray at 10 cm 15-20
 A2 lighter gray 10-15
 B1 yellowish 10-15
 B2 reddish 10-15
 thin root

Grasses

Andropogon of yellow

Elyonurus

Heliconia

Paspalum

Axonopus

Melinis

Trachypogon

Various legumes have tuberous roots.

Stylosanthes

Indigofera

From here on - first
 some more typical savanna
 with *Curatella*. Then
 a large depression with
Mauritia and other trees.

More savanna.

Then a large river with
 disturbed and more forest
 undisturbed gallery forest
 cult. patches of manioc &
 bananas.

Then savanna again.
 Then lots of great area
 similar to that examined.

with only tiny *Curatella*.
 Enormous area of this
 with very widely spaced
 patches of wood and
 very occasional isolated
 trees, with much fresh
 burning locally.

Crossed another river with
 gallery forest.

Then open area with
 abundant *Curatella* not
 more than 15-20 dm. tall.
 1-2 m apart - becoming
 less abundant as we go
 on. A very few wooded spots,
 but much on horizon.

Then a large "marichal"
 stopped here. It
 occupies a depression of
 several m. depth, muddy
 in bottom, the palms
 surrounded by a muddy
 area of rank herbs and
 suffrutescent herbs to 2 m. tall.
 Various sedges, ~~Phragmites~~ *Ludwigia*,
Melastoma, grasses, etc.

South of this a vast
 slightly rolling completely
 open area, no trees even
 on the horizon. Tiny *Curatella*
 abundant, 1-3 dm. tall. generally
 short grass, some fresh burns.

Photos
 12 x 18 mm
 (beginning
 new v.)

Then an area of shrub
 savanna with shrubs
 0.5-1 rarely 2 m tall.
 locally dense scrub,
 forming a mosaic.
 patches of open *Mauritia*,
 then dense *marichal*,
 occupying a considerable
 area sloping down to a
 depression with a grassy
 swale, then a river.

Rio *Marichal Largo*.

On other side of this an
 immediate escarpment
 of at least 15-20 m. or more.
 On top of this more
 open area with abundant
 dwarf *Curatella*.

Curatella slightly larger
 outside the fence, along
 road. Area completely
 open - to forest several
 miles away or beyond the
 horizon. Then a small
 patch or two closer to road.
 Recent burns with dead
Curatella shoots.

Some small ponds but
 mostly in artificial pits.

To right no trees as far
 as one can see. On left
 a forest (gallery?) on horizon.

This relation extends for
 some miles. The "treated" area

must amount to many sq. mi.
Doubtless if the shrubs are
destroyed once they are kept
down by frequent burning.

Where there are borrow
pits in this region the
red soil begins only a few
inches down. But this
should be checked in
fresh holes.

A small coconut plantation
near village. Looks poor.
Village called Temblador (-electric
eel).

Beyond this, a vast treeless
area. Then the Temblador
compound of Creole Co. where
we had lunch.

Return trip —

Some areas where, after a recent
fire, *Pyrosoma*
a few inches tall is the
only plant remaining.

Northward from Temblador
the gray layer seems to be
much thicker than the few
inches at in the Temblador
region.

Galley forest along Rio Morichal
Large a tangled mass of
Ficus, Mauritia, etc. with

many lianas, ^{Heliconia and} ferns
such as *Blechnum* on floor.
A peat layer on ground, from
2 cm to very thick on
white sand. The canopy
is irregular, up to 15 m
high.

In river are *Eichornia*,
Pistia, *Salvinia*, *Azolla*,
and an enormous thickened
Spirodela. A bit of *Monticardia*
in a nearby place.

North of river the gray or
yellow gray layer is again
only 1-2 dm. thick.

Morichales tend to be
surrounded by a marshy
zone. An open *Amorichal*
has many dead *Mauritia*,
bare poles.

Stop at a *matia* or
patch of wood in swamp.

The surrounding
plain is covered with
bund grass with a space
filled by an *Eragrostis*
scattered dwarf *Pyrosoma*
+ *Curatella* with heavy
root crowns. *Borreria* vert.
common. Other herbs less so.

The patch of woods
is of secondary nature,

including *Vitex*, ^{*Buddlea* *capitata*} *Desmoneus*,
 & various secondary species
 surrounded by a zone of
Anacardium with
 its leafy surface slanted
 outward shaded from above
 by the forest trees, with little
 or no grass beneath them.
 Doubtless shaded out inward
 but persisting on edge.
 Being fire resistant the
Anacardium maintain
 itself and keeping the grass
 down, protects the interior
 more fire susceptible trees
 from fires.

Since the mata flora is
 secondary, it may be
 an indicator of a former
 patch of better forest, a relic
 perhaps. People would have
 cut it and raised a crop of
 corn, abandoned it, and
 it would have reverted
 to secondary forest, leaving
 a pseudomorph of the
 former forest patch.

another north, across
 a river, are some pools
 of water also water in
 hollow pits indicating
 that the water table is very
 near the surface at least
 locally.

Not far south of the Maturin
 is an extensive area with
 scattered large umbrella
 crowned trees of various
 species, probably relics of
 the former forest. In one
 area these are close enough
 to form an open or semi-open
 forest, with much bamboo.
 This may be similar to the
 original forest of the region.

May 10 - Jurepin area. The
 upper terraces are principally
 covered by *Cratella* savanna
 the ravines and slopes
 by thicket.

From here west on
 main road toward La Ceiba
 In valley bottom near
 Jurepin where forest is
 replaced by thicket
 the thicket seems to have
 a much more xerophytic
 aspect than the forest.

Back up on the terrace - said to be "lower llano". *Curatella* savanna seems general, but the *Curatella* has apparently been cut at some time in the past, as it is mostly not more than 1 m tall, or very locally taller. The grass is generally a bunch-grass (*Axonopus*?) 0.5 m or usually less, tall. Locally recently burned. Abundant patches of *Hypoxis* *suaveolens* with long inflorescences to 2 m.

A few miles west we seem to be on upper slopes of a very wide river ravine. Here the *Curatella* and *Byrronima* are much more abundant and taller, ranging up to 3 m tall, with very rounded aspect. Locally close enough to be called open scrub. Farther down in ravine is rather low gallery forest. The scarp on the south side is steep and abrupt, but rather dissected.

El Tejera

Curatella savanna again, rather low but some shrubs

to 3 m. the grass is quite short, seldom 20 cm.

Then a very large area in which there is only ~~the~~ an occasional tiny plant of *Curatella*. Mostly short, burned off grass. Obviously treated. After that, on south side of road more or less normal savanna, on north side no bushes.

Then a mosaic of treated and untreated land. Then large areas treated, or at least, free of bushes. Then areas that are actually open scrub to ~~the~~ open scrub forest.

Stop in an area of ~~open~~ scrub forest.

Here on slightly undulating sandy ground is a mosaic running from an almost closed growth of *Curatella* to 5 m tall with an understory locally of *Croton*, locally of *Casalaria silvestris* with some admixture of *Xanthoxylum* & several other shrubs, to ~~an~~ open scrub forest of same composition.

but without *Croton* or
locally with it, and
with some scattered grass
(^{and *Curatella* bushes})
in an open scrub of —
which is a fire-resistant
thing ~~all~~
in ~~both~~ are *Curatella*
of very good size

Cochlospermum
Gutierrezia
Yucca
Xanthoxylum
Randia
Lespedeza
Casahuate spp.
Croton
Genipa

In the open *Casahuate*
scrub there is no grass,
yet the base of the
shrubs are charred.
Possibly annuals or
geophytes provide fuel.

This seems to be on the
bottom of a very broad
ravine.

As we get back up on
plain there are disturbed
outcroppings of indurated
laterite or "ardecife". This

is not a continuous
crust, lying on a
gravel with much
ferruginous matrix.

On this is short
grass with scattered
Curatella bushes.

This plain here
is very much cut
by ravines, landscape
red. Different scarps
show different degrees
of induration. On
plain are tracts of large
laterite boulders half
buried.

This changes rapidly
to an ungullied plain,
short grass with rather
widely scattered rather
large *Curatella* (2-4 m.)
(Badowski says this
grass never reaches more
than an upper limit of 1 m.
in growing season & now
it is to 20 cm.)

Curatella soon becomes
more abundant, then
much less so or almost
absent over large areas,
few small outcrops of
laterite. Terrain
slightly rolling.

many large boulders
of laterite locally.
Cuts show gravel.
Very large area with
almost no *Curatella*,
even tiny ones.

Rolling grassy hills,
very little *Curatella*,
but in depressions a
very broad savanna it
forms open scrub.
And there are a few
remnants of gallery
forest.

Some patches of well
developed *Curatella*
savanna on plain.

Surface soil is usually
gravel, but patches of
sand remain.

Possibly excessive burning
can, unaided, remove
Curatella?

Much gully erosion
locally. In gullies
may be *Curatella*
but tending to be richer
shrub composition.

A deep river valley
several miles wide
and perhaps 50-75 m
deep, cut in this plain
is essentially wooded.
Photos of road cut
into escarpment to
show nature of material
and of escarpment itself.

Gravel of pebbles and
cobble up to 20 cm but
rather flattened, rounded.

This valley is *Quebrada
Gacha*. Wood on flat
bottom tends to be
an irregular thorn forest.
with *Prosopis*, *Cereus*,
etc. and openings with
scrub. *Croton*, etc.

Pereskia *Copaifera*

Platymiscum

Caesalpinia

Shrub layer is mostly
not spiny - *Croton* &
other woolly shrubs.

near La Feiba.

Toward Santa Rosa
in this valley bottom
a less thorny vegetation,
essentially an open brush
scrub with scattered
trees & clumps of taller
shrubs. Photos red & b & w
This is scarcely spiny

except for *Persia*, which is common and *Cereus*, which is occasional.

The opposite escarpment shows spectacular *scoria* erosion. At top are rounded gravel hills, with *Caesalpinia* savanna. Laterite exposures near tops.

Then graded gravel with an open scrub similar to that in bottom of quebrada, but greener, perhaps more springy.

This changes to an open microphyllous thorn scrub or scrub forest.

Then, farther on, an almost closed forest more a less microphyllous with *Bromelia pinguin* on ground. It takes

About 8-10 m. This alternates with leguminous thorn scrub forest, and with semi open areas.

Endoshi says less rain in this whole area than where there is savanna. Need a certain amount to provide grass for burning. Overgrazing can also change savanna to scrub.

Gradually climbing through thorn forest, to a plain covered by thorn scrub. Big oil refinery. ~~Pointe Rouge~~

Continue through microphyllous thorn forest. Seem still to be climbing. Oil installations throughout the area.

Thorn forest varies from open to closed, much *Persia*.

Then a few open areas with dry grass & scattered large trees - prob. artificial. Mostly thorn scrub or forest, very irregular. *Persia* is commonest tree, usually dominant.

Then *Arceuthobium*.

South toward El Tigre through thick thorn forest. occasional clearing along highway - thorn forest ~~becomes~~ changes from green to leafless and white, or slightly green. If very green mixed, but mostly deciduous. A few *Cereus*.

Many vines, some climbing *Cereus*. Some areas ~~are~~ scrubby. *Centropogon*

Same semi-deciduous to deciduous forest, locally degraded.

On top of rolling hills forest opens up to savanna, in lower spots it is thick forest, green to deciduous. Then an extensive high plain with very open savanna, with very widely scattered *Acacia*, *Curatella*, etc.

Then thicker *Curatella* savanna, then mosaic of more open and less open *Curatella* savanna.

Mauritia scattered along a shallow ravine. Rolling flat land, mostly very open, but with dissecting depressions. Vast sandy area with almost no trees or bushes. Locally more shrubs.

In shallow ravines the trees are closer together. Small river.

Then more open grassland with few bushes. Then almost none for a distance.

Stopped at a slightly rolling area of bunch grass on very fine gray silty sand, firmly compacted, over which is drifting a thin layer of reddish sand, partly covering ground.

Photos of this showing tufted bulbostylis, a leguminous herb several spp. grass. *Curatella* is absent almost ²⁰ from most of it but there is a patch of it. *Brysonima* toward the top of a small rise on top of which there is a small burrow pit, which cuts thru a 2 ft. yellow silt layer, very hard, over a layer of concretions.

Below

Trachypogon

Axonopus

Aristida

Andropogon

+ *Carex*

In the area where the *Brysonima* forms a scattered shrub layer there were backshot in the surface. Surface is hard. Here the flora is a bit different, with *Pynchospora*.

In bunch grass there are a number of legumes *Cassia* 2 spp. *Galactea* 2 spp. *Stylosanthes* 2 spp. also *Paspalum* *fridida*.

May 15 - 2 km. south ^{east} of
Maturin
in open, treeless grassland
with sprouting *Curatella*
~~stems~~ crowns.

- 45 220 ~~Vernonia~~ *Andropogon*
common in patches
- 1 21 *Stachytarpheta*
occasional
- 1 22 *Hibiscus Pavonia cancellata* det. Fryxell, 1977
occasional
- 1 23 *Buchnera*
occasional
- 1 24 *Hyptis cf. suaveolens*
very common in patches
- 1 25 (comp.) *Centrantherum punctatum* Cass. - ^{det. H.E.} Robinson, 1974
occasional
- 1 26 *Desmodium* ⁺ *Lornia marajoara* Huber
occasional
- 2 27 *Waltheria americana* det. Steyermark, 1980
common
- 1 28 (legum.)
common
- 1 29 *Andropogon*
common
- 1 30 *Andropogon*
common

May 15 - about 5 km. s. of Rio Tigre,
about 60 km s.e. of Maturin
in marshy ground in depression
around a "morichal" or grove of
Mauritia minor.

flowers small, pale
purplish.

procumbent; flowers
bright yellow, maroon center.
flowers blue.

dead panicles to 2 m. tall;
very aromatic.
flowers purple.

erect suffrutescent herb,
sparsely branched,
to 1.5 m. tall; flowers yellow.

in stiff clumps
in tufts

- 45231 *Xyris*
common
32 *Rhynchospora*
abundant
33 (*erianth.*) *Syngonanthus caulescens* det. Moldenke
rare
34 *Ludwigia*
common
35 (*clastr.*) *Davilla* det. Steyermark,
common around edges of

May 15 - Rio Morichal Largo,
25 km. n.w. Temblador, s.e. of
Maturín

- 4 36 *Ficus*
common in gallery forest
on white sand covered by peat.

May 15 - between Rio Tigre
and Rio Guainí, about
50 km. s.e. Maturín
a small patch of woods
in savanna.

- 3 37 *Buchenavia*
in edge of
2 38 *Cordia* *verbenacea* DC.
at edge of
1 39 (*clastr.*) *Davilla* det. Steyermark 1980
at edge of
81 40 *Vismia*
at edge of
4 41 *Vitex capitata* Vahl det. Moldenke
common in

flowers yellow

1980

suffrutescent herb 1-2 m. tall;
petals yellow.
woody twiner, climbing
on bushes; fruit yellow, airt white.

tree 15 m. tall, with clean
trunk and spreading
roots at base, bark
milky when cut; fruit green.

tree 15-20 m. tall; fruit green.

shrub 1 m. tall; corolla white.

twining vine, fruit orange-
yellow; airt white.
small tree; sterile.

small tree, flowers violet
"flor azul"

45242
2*Simarouba glauca*
occasionalsame - savanna just
outside a patch of forest.

4

43

Curatella americana
common

det. Steyermark

1980

2

44

Ocaina Ouratea grossourdyi

det. Steyermark

1980

occasional at edge of
patch of forest

2

45

*Psidium*occasional at edge of patch
of forest

1

46

Anacardium occidentale L.
abundant in savanna
around patch of forest,
forming a narrow belt
at outside of forest.

4

47

Brysonima crassifolia (L.) HBK.
common in

2

48

Psidium guineense Sw.
common in

1

49

Cnidocarpus urens Arth.
occasional

1

50

Eragrostis
abundant between
bunch grass

4

51

Psidium
occasional at edge of
patch of forest in savanna

2

5252 (Apr.)

rare in patch of forest in savanna

tree; fruits blue-black,
fleshy, not very tasty.sprouts from root crown
that reaches surface of
ground- slender shrub 3 m. tall,
receptacle pink, seeds
green, flowers yellow.- shrub 3 m. tall,
flowers white; fruit immature.shrub 2 m. tall, flowers
reddish; fruit immature
(receptacle acid-sweet
when mature and enlarged)shrub 1.5 m. tall,
flowers yellow, fruit green.
- shrub 1 m. tall; fls white.erect, lactiferous herb
to 1 m. tall, flowers white;
- stings viciously.
all seen dead, certainly
an annual.shrub ~~2~~ 2.5 m. tall,
flowers white.lactiferous tree; flowers
white.

48

1944 Venezuela

45253 (anacard.) *Conarus* det. Steyermark, 1980
4 occasional54 *Coccoloba*
occasionalMay 16 - ^{about 35 km} west of ~~Matobamba~~ ^{Punto de Mata}
on highway, near fork to Tonna, Monagas
in open to closed scrub
forest, mainly of *Curatella*3 55 *Casahuate silvestris* Swartz
abundant in opening.1 56 *Psidium guineense* Sw.
common2 57 *Croton*
abundant in undergrowth1 58 *Cochlospermum*
rare1 58a ~~58~~ *Panicum*?
in open stream course
May 16 - 2 km. e. of La Ceiba,
Ed. Anzoátegui3 59 *Stychnos p. fenderi* det. Steyermark 1980
in woods on escarpment

May 16 - La Ceiba, Anzoátegui

in undergrowth in thorn forest

1 60 (sterc.)
occasional2 61 *Croton*
abundant

Monagas - Anzoátegui

49

tree, fruit green.

tree sterile.

shrub 1 m. tall,
stem corky, charred,
flowers white.shrub 1.5 m. tall, flowers
white.

shrub 1 m. tall.

small tree.

prostrate, bluish,
eaten by cattle.

tree, trunk spiny.

shrub 1.5 m. tall, flowers
bright purple.shrub 1.5 m. tall, spikes
pendent.

May 16 - Between La Ceiba
and Santa Rosa,

in xerophytic scrub on
gravel flat

45262

rare

2 63

occasional

1

64

Eryth. ? *Erythroxylon steyermarkii* Plowman
det. Plowman 1982

common

3

65

Lippia ? *Cordia steyermarkii* Agostini
ined.

occasional

May 16 - ^{5 km.} v.n. of El Tigre

in bunch-grass savanna
on fine silty sand.

3

66

Passiflora foetida L.
common

1

67

Galactea ? *jussieuana* H.B.K.
occasional

1

68

Galactea ? *Clitoria guianensis* (Aubl.) Sw.
occasional

2

69

Cassia flexuosa L.
occasional

1

70

Bulbostylis
abundant common

1

71

Stylosanthes guianensis (Aubl.) Sw.
rare *Eriosema crinitum* (Kenth) G. Don

1

72

Stylosanthes guianensis (Aubl.) Sw.
rare

shrub 1.2 m. tall, buds
yellow.

shrub 1.5 m. tall, buds
yellow.

shrub 1.5 m. tall,
aromatic.

prostrate, stems
radiating from center,
fruit orange when ripe,
edible but not inspiring.
glaucous, deep rooted herb, flowers
purple.
glaucous herb, very erect.

dry

erect, flowers yellow,
turning red.
erect

same - on hard compact
yellowish ^{gray} silt, with
abundant "buckshot" concretions

45273 *Rhynchospora*
common

1 74 ?

1 75 *Palicourea rigida*
rare, on bare soil
rare

2 76 *Brysonima crassifolia*
common locally

May 17 - about ^{20 km} west of El Tigre

1 77 *Linum*
rare on hard cracked clay & silt
with sparse grass

May 17 - ~~about~~ ^{s.e. of Gachipao, headwaters}
of Rio Guere, west of El Tigre
^{great}
is on edge of ravine
cut in savanna covered plain

1 78 *Ocuma*
occasional

1 79 *Copaifera*
occasional

2 80 *Randia* ?
occasional on bare soil

caespitose, dry.

erect

sprouts from burned
off root crown; thyrse
and corollas yellow, fruit green.
leaves very stiff
shrub 1.5 m. tall,
fruit green.

(L.) HBK

flowers yellow.

rigid shrub 1 m. tall,
receptacle red, seeds green.
tree, buds reddish orange.

erect, stiff, almost leafless
shrub 2 m. tall

San Tomé -

May 17 - bus trip, El Tigre -
Vall de la Pasera + Calabozo
Left at 7:30

Principal street trees are
Mangos, Casahuate of sticks.
Pelonix. Mangos are ripe.

(Man from Mere grande
Co. says all savannas are
burned at least once a year,
some two or three times.)
E. of San Tomé Curatella savanna
then a morichal along a
river.

~~El Tigre~~ San Tomé

West of this extensive
Curatella - bunch grass
savanna, but with a
conspicuous reddish sand
darker between the bunches
of grass.

In market - El Tigre
onions, yuca, potatoes,
cabbage, bell peppers, cucumbers,
cantaloupes, sweet potatoes,
an assortment of squashes
(C. max), tomatoes, eggplant,
garlic, rice, several colors of
beans - black, pale green, brown, hints
chili, melon, lime, mango,
plantains? ginger, papaya,
peanuts, coffee, ~~tea~~, dry
maize, bananas, mangos,
yam, shondia, iuca, bix,
cauliflower, pumpkins, okra

Talisia
no, shinsch
chico
broccoli
dividivi
guava
coconut
stump, bean
cabbage
avocado
guava
pumpkin
Tamarind
Vigna cylindrica
P. lunatus
P. vulgatus
Cucurbitaria
chama
amaranthus
muscum
Palata
P. trifida

Tomate
peña
chil dulce

A medium size pear shaped
tomato, as well as ordinary one.
Chile is a small ~~peña~~ ^{salad} in, about 2-3 x 1-2 cm
celery, parsley, orange,
string beans, avocados, ingo

Large tortillas of manioc called
casave. up to 1m across 5-8 mm thick

Interesting that there are
very few mangos for sale - perhaps
reflects that there are so many
produced locally and available
for the taking.

More cure - Lisania ^{smaller like} ^{subodilla} ^{sleeping} ^{shells}

Photos of some of the
products.

West from El Tigre -

Curatella savanna on a
red sandy soil - The red
sand reaching a considerable
thickness 1 m + ? judging by
an exposure in a pit.

The pit shows the cracked
silty material, blocky, up to 1 m.
Several low small hills,
covered by concretions.

Seem to be old erosion remnant
rather than dunes, even
though shape is that of
dunes. Some may well
be dunes, others have laterite
outcropping.

Trees very sparse to
almost lacking.

P

Stop some miles. N. of
 C. T. is in a low silty area
 of *Curatella* savanna - the
Curatella rather irregularly
 distributed. Finished at N. roll.
 Scattered low rounded
 gossian remnants. Linn.

P

Somewhat west of this the
 road skirts the head of
 a great ravine with
 red to mauve cliffs, mostly
 wooded, but some gentle
 slopes grassy.
 Photos, Kod. & start for N. roll.
 Quite an assortment of tree
 and shrub.

West of this the savanna
 thickens up to form an
 open forest, ranging even to
 closed scrub forest and in
 the other direction to savanna. The
 grass is more abundant in the
 more open end of the continuum,
 scanty in the closed part; where
 there tend to be shrubs.

Terrain becomes more rolling
 and gullied.

Barro Colorado

Aspect becomes suddenly
 drier, relief more sharp.

Then greener again.

Locally more or less typical

Curatella savanna, more
 prevalently open forest.
 Then, suddenly, deciduous
 scrub forest, then green
 again with patches of
 savanna. Generally
 varies between ~~open~~ savanna
 and open forest. Grass
 rather general.

Stop in savanna of
Curatella, *Bowditchia*,
Pyramnia crassifolia, *B. cordobensis*,
Rourea complicata, *Psidium*
guineense, *Casahuate*, *Silvestra*,
 and bunch grass that is
 up to 1 m. tall *Hyparrhenia*
rufa. The trees here are
 up to 10 m. tall perhaps
 10-20 m. apart or more.

Lutite crust exposed
 in ravine (sample) shows
 striking accretionary rings.
 These may very well be
 result of alternate wetting
 and drying. Form around
 nuclei of finely mottled
 gray and brown clay.

Farther west the country
 becomes ~~at~~ more
 dissected and vegetation
 becomes more and more
 or deciduous scrub forest.

but with occ. green trees. Patches have recently been felled and burned. Site is open enough to be savanna, but tends to have a more or less continuous deciduous shrub layer.

Then a fine *Copernicia* savanna with grass and locally some other trees. Where there are more other trees grass is denser. Patches of this palm savanna are fairly abundant. Interspersed is open deciduous scrub or forest, locally tangled deciduous thicket. Then microphyllous thorn forest and thorn savanna. *Copernicia* savanna with abundant grass up to 1 m. tall. The palms in any one place are fairly uniform in height. But from place to place range from 3 to 6 m. Some are coming but more in other veg. than with *Copernicia*.

Much recent burning through all this country.

Many flat topped or umbrella crowned trees, but not very tall.

Then more typical *Crotonella* savanna but with fairly large trees. This gradually closes to open scrub forest and even locally closed scrub forest.

Ravines have gallery forest.

Much more *Copernicia* savanna.

Then deciduous or semi-deciduous open forest and thicket. Palms (*Copernicia*) scattered irregularly in this. When in "palm savanna" the *Copernicia* seem to be much more even in height than when in other vegetation.

Forest tends to be more deciduous and bare.

Then extensive open *Copernicia* + grass savanna. One area seen where all palms were under 1 m. tall.

Stop. E of Taquarí, exit of Santa Maria de Ypiranga for photos of extensive *Copernicia* savanna on gently rolling land, very extensive. Not much but grass under the palms.

Then good deciduous forest. 15 m. tall, open to closed. Patches of thorn forest or scrub. Patches greener than

others.

Tagayabire - Deciduous
forest, more or less thorny.
Copernicia seeds. The
Copernicia shows various
narrowing on the trunk.
See Vareschi grapes.

the Manor of Hering.

A good bit of cleared land,
burned areas. Irregular
deciduous scrub. Between
this locally thin, out
to form savanna, which then
becomes locally savanna, locally
dense to form thicket.

The get ~~green~~ green
again, ~~and~~ and then thin
out become mixed dipterocarp forest
~~of many deciduous~~
~~wooded~~ In all the ~~same~~
numbers of small ~~and~~
~~equated to fire~~ desiccating
frosts. Gradual change to a
very "patchy" savanna, with
dry grass palms, most of
~~bushes~~ the savanna bushes and
trees ~~are~~ ~~savanna~~. They
get farther apart - grass between,
then closer together until
a ~~into~~ a layer is formed. The
~~becoming more~~
and more continuous until there
is a continuous, locally open,
~~the~~ thickened scrub.

Flowers increase, till it
is good deciduous forest.
Then there is a large
area of grassland on its side.
Then a mosaic of
savanna with trees, grasses
and deciduous forest, then
a mostly savanna
landscape, or rather,
rolling ground, then
more than scrub, closed.
Valle de la Pasena.

Some cultivation. Then
mosaic of deciduous
forest and cleared land
that assumes character
of savanna. *Stump*. Still
remain on some of it. This
seems to be a broad
strip on both sides of road,
and extends a good distance.
Microphyllum then a
scrub may come in when
deciduous forest is destroyed.

The deciduous forest varies from open to closed, is about 10-15 m. tall, has a shrub layer some m. tall, also deciduous.

Then fairly extensive
clearing ~~the~~ scrub. Has been
burned recently in many
places. Scattered *Copernicia*
in it. Considerable clearing and

burning. Some trees scattered in scrub areas.

Then grass with a few scattered trees in flat low ground, deciduous forest on hills or escarpment, at Picapica. This is south of road. Then scrub north of it. Doubtless an old clearing.

Then thorn scrub on both sides. A picturesque arc-crescent dunes appear locally. Then areas of *Copernicia* savanna surrounded by thorn scrub and thickets. Some low hills and much cleared and burned land.

Then rather well new grassy clearings. First open thorn scrub and closed deciduous forest.

Chaqua rama.

Mosaic of deciduous forest and clearings.

Then semi-open thorn scrub with scattered large, mostly deciduous trees. Then locally more abundant. By far the largest clearings. Some of these invaded extensively by *Crotalaria*.

More clearing than forest.

Then a large fire on left side. Photos. Severe enough that few smaller plants could survive, but ~~the~~ the scattered trees probably not damaged.

On other side a bunch-grass pasture of *Panicum maximum*, with some palms, a few other trees. Along the road are ~~scattered~~ clearings, mostly recently burned, but beyond a ~~couple~~ couple of hundred m. deciduous scrub, or forest. In places reaching road. More and more along road. Generally the scrub is 2-3 m. tall, closed, with scattered trees. The cleared strip along the road is a frequent feature. Burned clearings with stumps are common. Patches of good forest with flat topped trees about 10 m. are common. The other phases appear to be degraded from this, or in succession back to it from clearing, if not actually cultivated or managed as pasture.

Then some low rolling hills, mostly cleared but with patches of deciduous forest. The cleared part in grass with scattered trees.

Much burned land.

Then flat grassland with scattered flat topped trees on one side of road, tall scrub with similar scattered trees on other - all deciduous. Cattle grazing in the grassland. Several ponds.

Then, on other side, much burned land. On south side guinea grass pasture.

Broad burned strip on each side.

Patches of taller forest, tending to be evergreen - really gallery forest along ravines. But some fairly tall deciduous forest in small patches.

Much tall thorn scrub scattered trees and patches of forest. Burned areas and clearing. The thorn forest begins to show a tinge of green.

Large areas of mixed thorn scrub and deciduous

forest.

From a small rise it appears that the deciduous forest characterized by a very gray brown color, extends a long way in all directions.

This varies in density and proportion of trees to shrubs - shrubs form a 3-4 m. story generally, closed. The trees may be 10-12 m. tall. Some *Copernicia* scattered in it.

We seem to be gradually climbing, but this may be an illusion.

On top of a long rise this tends to thin out and become more open, though otherwise not changing much.

Thickens up again, with a few more green trees in it. Palms are fairly common.

Locally the forest looks about half evergreen. Many rather open areas.

On the east side of a low range of hills the evergreen elements seemed to increase in proportion, but from top, the forest as far as one could see is bare.

In a good distance the

vegetation is rather
irregular and thickety.

Then on right a vast
cleared and burned area
with scattered trees mostly
Capparis (?) and Copernicia,
with grass in unburned
portions.

Then some forest again, but
entire aspect - forest, trees in
savanna, etc. have become
green. Gallery forest along
Rio Guárico
at El Fombrero.

Turned south here.

Cleared land and semi-
deciduous thickets. Scattered
tall evergreen trees in cleared
dry land. This is essentially
bottom-land.

Copernicia very common
locally. The scrub & thicket
as well as trees here are
green.

As we come up out of bottom
land there is extensive cleared
land - grassy with scattered
trees. The trees are ~~mostly~~
mostly umbellifers, medium
height. On dissected but
rounded escarpment there are
almost continuous thickets,
all green.

Then on top of this a semi-

deciduous ~~woodland~~ ^{open to closed}
thickety forest. Then a
savanna that approaches
open forest, this semi-deciduous
La Encrucijada.

Savanna with abundant
trees. Then rounded
gravel hills with semi-
deciduous scrub, then
areas of open scrub & savanna.
Thorny. Scattered flat
topped trees in scrub.
Copernicia common.

Shrub-savanna to open scrub.
The commonest shrub in
all this appears to be a
microphyllous Acacia.

Now a larger leaved green
open scrub alternating
with savanna. Now
Byrsonima and some Caratella,
also Bowditchia. Savanna
and patches of "mato".

Savanna with trees
to 8 m tall or more, thick
grass where not recently
burned.

This merges into an open
never closed and tangled
scrub forest.

Then open savanna with
scattered large shrubs
and small tree, irregularly
distributed.

Then some cultivation
and more open savanna.
Ravines and dissected land
are forested.

Thick open scrub; then
savanna.

We seem to be following a flat topped wide ridge between two dissected, wooded areas. On top of this varies from scrub to savanna to palm savanna, to grassland. Palms mostly very short.

Broadened at vents an
extensive open savanna.
Curatella - Brysonina of all
sizes. ~~Tree~~ Trees and shrubs
become very scarce except
Cofernicia which becomes
very common.

Then small patches of scrub. Then ^{large} areas of grass with small *Brysonia*. Patches of larger ones.

Wood, plant become very sparse ex. local areas of palms. On right a more wooded area slopes down to the reservoir. On left irregular rather clumped trees and shrubs in grass.

Rather irregular, sawing
continues for some distance

much laterite locally
on surface.

It is largely a semi-vesicular mass, but has quartz, sandstone, and other pebbles cemented in it. The exposed part is badly weathered, surface is black.

Byrrhina verbasifolia
common here.

May 17 - west of Pariaquán,
Est. Guárico

in savanna of *Hybanthus*
and several species of trees
on flat hard ground

45281

Roupala intricata

3

common

2 82

Roupala intricata

common

1 83

Bowditchia

common

3 84

Brysonima coccolobaeifolia

common

1 85

Hybanthus rufus

dominant in grassy area

May 17 east of Taguapire,
east of Santa María de Uchire
roadside in savanna

2 86

Helicteres

common

May 17 just west of Chaguaramas
Est. Guárico

on weedy roadside in dry forest area

1 87

(malv.) AERISSANTHA/crispa (L.) Briz. det

rare

2 88

Zephrosia cinerea L.

common

tree 5 m. tall, leaves stiff

young sprouts from stump,
sterile.

small tree; sterile.

small tree, petals pinkish

small tufts, culms
arching, to 1 m. tall.

shrub ~~1.5~~ 1.5 m. tall,
corolla scarlet, tubular.

Fryxell
1977

herb 1 m. tall, much branched,
flowers pale pink.
flowers purplish.

May 17 n.e. of Calabozo
in savanna

45289 (annul.)

1 in bit of woods

3 90 *Byssonima verbascifolia*
common locally

May 18 - Proyecto Guárico,
s. of Calabozo
weeds around farm yard

1 91 *Paspalum*

2 92 *Amaranthus dubius* Mart.

2 93 *Sida* ?

abundant

1 93a ~~Ludwigia~~ *Aeschynomene scabra* C. Wright. petals yellow small.

1 94 *Portulaca oleracea* L.
common

1 95 *Spermacoce verticillata*
common

1 96 *Euphorbia*
abundant

1 97 *Turnera*

1 98 *Heliotropium cf. ovalifolium*
occasional

same in rice field, shaded by rice

1 99 *Ludwigia*
45300 *Behnuchloa colonum* (L.) Link
abundant

2 01

1 02 *Leptochloa*

(L.) Rich. sprouts from woody
root crowns; flowers yellow.

culms erect.

erect, spike somewhat nodding.

spreading sparsely
branched herb, flowers

white to pale pink.

spreading fleshy herb,
flowers open at 10 a.m. petal
yellow, notched stamens few.
flowers white.

Plants erect, ascending

flowers yellow; stems

many from root crown.

fls. white.

petals pink-purple.

very strictly erect.

flowers yellow.

panicle purplish.

May 18 - bus trip Calabozo south
to San Fernando de Apure

Cumatella - *Bursera* savanna just out of
town. Then gallery forest
where we crossed a river.
Rice fields ~~over~~ over a
very large area. Trees
around dwellings and
scattered elsewhere locally.
Large irrigation canal; with
marshy spots and ponds
along road with *Typha*, etc.

One bank of canal follows
road, the other two at right
angles. Rice seems in all
stages, from fallow to headed
out 100-150 days to maturity

Weeds

planting from mid-December to May

Heliotropium andinum

Cleome spinosa

Portulaca dubia

Reason for only 1 crop a year
is that between crops they
put cattle on the land to
control the weeds.

Borreria verticillata

Lida sp. (white & pinkish fl.)

Euphorbia cf. *glomerifera*

Portulaca ~~sp.~~

Lida acuta

Phaseolus latifolius

Eclipta alba

Heliotropium ~~sp.~~ *coral. glum.*

Cynodon dactylon

Alternanthera prostrata

Malabarica cf. alvifolia

Aeschynomene

Turnera sp.

Cyperus sp.

Paspalum

Amaranthus

These all in barnyard

In rice fields proper - ²⁻⁴ photos

Echinochloa cf. *colomum*

is principal weed.

There are many weeds
along margins and in ditches

Cassia tora (long pod)

Eclipta

Euphorbia cf. *glom.*

Cyperus sp.

Ludwigia (suffr.)

Hyparrhenia rufa

Scoparia

Rice is harvested while straw
is still green. The machine chops
the straw and it is left in the
field. Cattle are turned in
after harvest.

Poles from *Copernicia* are
used abundantly in
construction.

17000 hectares in rice ^{Guano Project}
project much more.

On south - some large trees, round crowns, low branches scattered in fields. Delonix in full bloom. Large trees more abundant southward. groves also. Cultivation less intense. Other crops than rice locally. Much more fallow rice land to south. Much newly plowed land.

Then canal turned left. Beyond this rice on left, cleared land on right. Other crops for a short distance. Then pasture, thicket and palm savanna.

Stopped just south of limit of cultivation. in an irregularly thickly vegetation, trees to 15 m. in an open forest arrangement but with thickets tangled with scrub and with grassy openings. Copernicia common, often with strangling figs. Soil fine, dense, cracked in blocks.

Guayuma common.
Caesalpinia cf. caiaia
Randia spp.
Dyeguesia (common)
Pterocarpus

to
no
wood

Analysis
Pterocarpus

Immediately south is Byrsonia savanna very open, small bushes only, short grass, rolling terrain, occasional thickets. Then some cleared land. Open part of Byrsonia adjacent.

More clearing.

Some open grassland, some savanna of palms and deciduous shrubs or small trees, some tangled open to closed scrub. Mostly irregular savanna.

Then more irregular thickets and openings.

Many cattle everywhere.

Small farms.

All along this road are ponds ~~and~~ occupying borrow pits. Many small crocodiles.

Scattered small patches of palm savanna. Then fairly general palm savanna with thickets locally.

Open desiccated low ground with thin grass & scattered trees, some palms. Thickety savanna, local patches of closed tangled scrub forest, prob. deciduous.

Large open areas of very short grass, with patches of scrub, scattered palms locally. It just appears to be gallery forest to left at varying distance.

Then savanna of palms and ~~scrub~~ microphyllous shrubs.

Becomes taller and thicker.

Palms locally very abundant. Patches of tangled scrub forest.

Deciduous. The palms very abundant.

Irregular patchy savanna, fairly large trees.

But becomes open - large areas of grass with few bushes - forest (?) in distance. Some patches of trees, but very large areas without any. Very short grass.

Thin patches of palms.

Continuous palm savanna, rather irregular, locally with, locally without other trees.

Several low photos.

a bit further north.

a stop on border bet. palm savanna and esters. (submerged areas during wet season) no woody veg.

The esters soil is deeply cracked, mostly bare but with ~~very~~ very open mat of ~~microphyllous~~ ^{microphyllous} up to two or three other very prostrate species (*Linum*? *Heliotropium*?) and with widely spaced *Heliotropium indicum* giving the character to the landscape. Slight irregularities in ground.

No essential difference in edge of palm grove except surface more irregular.

Several seedling palms in cracks.

On other side of road palms are about evenly distributed from rosettes to 7 m. tall, spaced from 3 to 3 m apart.

A few spiny shrubs and many mostly dry herbs covering a good part of the ground. Ground very rough with cattle tracks.

South the esters is on both sides, but as we approach ~~San Fernando~~ landscape becomes shrubby and with scattered trees & cult.

Then more low lying
land but with
scattered trees, grassy
some grassy and without
trees. This much
disturbed, many small
farms. Many shallow
ponds.

Then an extensive green
grassy landscape mostly
open but a few trees and
with what appears to be
the gallery forest in distance.
The grass appears to be
a coarse thing like
Panicum maximum but
eaten down to tufts 1-3 dm. tall.
Many ponds locally.

Then thickets and palm
groves appear, esp. near road.
Great flock of egrets
and scarlet ibis in a
pond along road.

One pond covered by *Salvinia*.

Then closed scrub forest
with abundant *Casipouia*.
Then open green grass
Ponds with *Eichhornia*
in flower.
Gallery forest in distance
to it.
Another pond with

hundreds of egrets,
some ibis, many anhingas.

Patches of palms & of
thickets. Open grass with
trees.

Rio Apur.

Large areas of apparently
cleared bottom land with
large trees, grassy areas,
cult. fields, etc.

Chenopodium planted
as an ornamental
at club.

Dense low tangled forest
along a dry channel.

Road from San Fernando to
San Juan de Payara.

Cult. field. Commonest
plant is *Sporobolus crassicaulis*,
Prosopea, *Guazuma*, *Picramnia*,
many broad-leaf trees.

Land is largely cult.
except for diversion.

Many large trees, tangled
ferns, rows, wooded channel
banks, etc. General aspect
is wooded. Bananas.

Many thickets. These
become more dominant.
Large *Samanea* abundant.
Patches of dense closed

forest called "calceat".
Most abundant plant
in fields is *C. crassicaulis*
called "celigonia".

The tree bet. tent to become
microphyllous. A caecitree
Bactis. Much open ground.
The ground here is deeply
cracked.

"Calceat" = very tangled
closed forest with an
abundance of *Licania*.

Entire area inundated
in wet season. Roads on
levees.

Inside of Calceat not
impenetrable, but edges
seem so. Locally very
dense and difficult.
Seems to be just dense
secondary thicket following
abandonment after cultivation.

Cynthina *Licania*
Coccoloba

~~Perezkia~~

Just outside is a well
with water about ~~2m~~ 1.7
3-4m down, in fine grained
soil. Cleared fields.
Perezkia used as living fence.

At edge of forest is an
area of loose, stiff
slender shrubs. Ground
cracked. *Eubateria odonatum*
common.

Large areas completely
open - low hard cracked
soil. Dominated at
this season by *Ipomoea*
crassicaulis. said to
be inundated 1-7 m. for yr.
Wooded areas dense and
tangled, crossed by
channels, now mostly dry.
The open ground seems
slightly lower.

North of Rio Apure
are dense palm forests
thinning out to palm
savannas. Then more
palm forests. Stumps
show that large areas
of this have been cut.
A small fenced patch of
forest ~~is~~ is burning freely.
Patches of Calceat,
and cult. fields.

North ~~of~~ Canaguana
several ponds with literally
hundreds of egrets, a few
scarlet ibises, aracets, etc.
eating small fish trapped
in the ponds.

Much burning going
on here.

Many of the ponds
~~have~~ have no vegetation
around margins. Why?

~~the~~ Carnaguan.

Turned east on dirt road.

Weedy pasture with
scattered large ~~open~~
trees on left, thicket
on right, then pasture
on rt. also.

May 13 - just s. of Proyecto
Guárico, s. of Calabozo
in open, tangled
scrub forest and thicket.

45303

Ardisia

occasional

1 04

Randia

occasional

3 05

Randia

common

45

May 13 - north end of
Estero de Cam ~~Baguan~~
^{Camaguán}
just north of Camaguán
in bare desiccated bed
of seasonal lake.

1 06

Trichospira verticillata (L.) Baker - det. H.E. Robinson, 1974.

rare

2 07

Heliotropium indicum L.

abundant, dominant

1 08

Heliotropium ovalifolium

rare

1 09

Mimosa

abundant, forming a
discontinuous mat

1 10

Mimosa

occasional

1 11

Hydrolea

rare

small tree, ripe fruit red.

sterile shrub, branches
in one plane.

- Tangled semi-scandent
shrub, branches very
stiff, decussate.

prostrate

erect, much branched,
to 0.8 m. tall, flowers lavender.
fls. white, planter

prostrate, sterile. very
sensitive.

- almost prostrate, very
sensitive, sterile,
prostrate.

May 18 - ^{near La Guama}
~~San~~ of
 San Fernando de Apure, on
 road to San Juan de Payara

in ~~the~~ tangled secondary
 forest called "calceñas"

45312 *bignon* *Tanaecium crucigerum* Seem.
 4 ~~liana~~ det. A. Gentry 1974

3 13 *Pereskia* & *guanacho* det. Steyermark 1980
 planted in clearing

same - in area of
~~forest~~ open scrub
 at edge of forest
 called "calceñas".

1 14
 1 15 *Copaifera* ~~connarus~~ *connarus* det. Steyermark 1980
 common

3 16 *Copaifera* *connarus*, det. Steyermark, 1980
 common

1 17 (flac.?) *Psidium* det. Steyermark 1980
 common

2 18 (flac.) *Hecatestemon guazumaefolius* (HBK) Steyermark
 common det. Steyermark 1980

4 19 *Pithecellobium lanceolatum* (H & B) Benth.
 occasional

3 20 *Paullinia*
 occasional

1 21 *Cordia*
 abundant

liana ~~flowers~~ corollas white
 falling readily.
 buds zygomorphic,
 pointed.

— small fleshy tree,
 almost spineless.

— Tree
 shrub fl. whitish
 fruits pendent, red.
 — shrub 1.3 m. tall,
 fruit range red.

— shrub 1.5 m. tall,
 flowers whitish

— shrub ~~2.2~~ 2.2 m. tall
 flowers whitish.
 vine, flowers white.

— shrub 1-1.5 m. tall.

1964

Venezuela

May 19

Estacion Biologica de la
Sociedad de Historia Natural
de Venezuela

Herbarium of several hundred
sheets from Calabozo Region
in good covers

Pit in typical savanna
shows a layer of fine
soil a few cm thick,
changing to a thick layer
of irregular laterite pebbles.
A *Curatella* plant about
2 cm diam at ground, has
vertical tap root reaching
at least 1 m, continuously bet.
pebbles. Branching somewhat
in soil layer.

Alouatta tree has an
enormous superficial
root system, reaching as
much as 15 m from trunk.

The vertical roots are
not too well developed, said
to be because of gravel layer.
but behavior in sand
should be checked.

Burned area has tufts
averaging 1-2 dm. apart.
Immediately adjacent unburned
grass is closed, continuous,
1-2 dm. tall.

Considerable accumulation
of pebbles on surface. Large
blocks of lateritic conglomerate
protruding where surface
slopes a little, some blocks
well buried in surface of
the gravel layer.

Geol. maps give age of
material as Pleistocene but
van der Hammen says prob.
lower Pleistocene or lower.
Much evidence of surface
erosion and deposition.

Little cotton windrows of
dead grass fragments suggest
sheet flow of runoff.

"Mata" occupy depression
in eroded surface, filled with
soil. Mixed non-savanna
shrubs & trees of forest

One very large one mata
is on an ordinary profile, without
the depression. This one includes
Curatella ^{Howarthia} suggesting that
the mata has spread over
an area of savanna when protected

from just periphery
of *Brysonima*, *Curatella*,
Chlorospermum, *Guettarda*,
Cordia, *Psychotria*,
etc. *Eugenia* or *Myrsine*

The grass is 3 dm. tall
outside this but it stops
abruptly at the edge of
the mata.

In the savanna nearby
each *Curatella*, *Brysonima*,
tree is an incipient mata
with ~~stems~~ *canoe*
~~the~~ seedling of various
species surrounding
it. It has been protected
from fire 3 or 4 years.
Grass is dense, 2-4 dm.
tall, tangled.

Locally the gravel
layer dips down some
m. and is covered by a
mottled clay that is
wet a few feet down
even in the end of the dry
season. This sort of
site marked by *Vochysia*
ponceguelana in the mator.

Photos low + high of local
but burned & unburned
savanna.

P

photos of *Curatella*
tree of comparable size in
unburned and burned
savanna

In burned
Brysonima
Psidium
Eugenia
Cordia
Alnus
and others sprouting but
not identifiable

Unburned
Eugenia
Brysonima
Cordia
Casahuate
Guettarda
Mimosa
Annona
Smilax
undent legum
Bowditchia
Chlorospermum
Cassia

May 19 - Trip by bus Calabozo to Maracay.

North of Calabozo. Curatella, *Byrsonima*, *Browdia* savanna.

Then along the dam across Rio Guaira - below dam is thin forest in valley bottom. Above is a great reservoir, in which are large areas of still standing dead trees. Below dam several ponds surrounded by *Zypha* marsh. Reservoir is down about 4 m. from high water. The ponds below dam are borrow pits from which the material for the dam was taken. Some of this area is savanna, some with *Copernicia* + acacia or *Prosopis*. Some Curatella, *Byrsonima*, savanna almost closed other with rather closely spaced small trees.

Beyond w. end of dam is thick Curatella, perhaps open scrub rather than savanna.

Then open forest to savanna of *Browdia*, *Curatella*, etc. rather short grass?

Landscape of well developed trees, to 5 m. tall or more, varies from savanna to

open, locally closed, forest. Then open *Byrsonima* - *Curatella* savanna. Grass grazed very short. Trees to 5 - 6 m. tall. Uniform over a long distance, locally thicker, even thickets tangled with vines. After some distance closed forest becomes general except where cleared. Some regrowth from clearings. Then this forest becomes lower and more microphyllous.

Hato El Corozo.

Then taller again. Closed, and tangled with vines.

Low than scrub. Then grass with scattered *Copernicia*. Locally the palms are absent. Locally spots of scrub.

Terrain becomes gently rolling and then scrub is the vegetation, open to closed.

Then mosaic of dense scrub and grass, with or without *Copernicia*. Large area recently burned. The *Copernicia* leaves killed but new ones appearing.

Mixture of deciduous than scrub and *Copernicia*. *Copernicia* ~~is~~ in places, esp. near there are tall trees.

Trees become larger, except

where burned.

Then a great extent of open to closed, irregular scrub, much of it recently burned. Some areas of it with *Copernicia*.

All of this scrub and most of forest seems to be deciduous but well on toward being leafed out.

Then rather well developed closed mic. of leaf forest, lower, more irregular in places. Locally openings with *Copernicia*.

Then thorn shrub savanna, then open forest with tall dry woods. Trees get taller, to 10+12 m.

Going down a very long gentle slope and the forest gets more general, more microphyllous, then lower.

Rougher land on other side generally forested with deciduous microphyllous trees. This runs up to some low rocky ridges with open forest.

On other side a rather broad valley with micro-

phyllous forest. See photos of this forest on ridge and in valley. Must be ~~in~~ north of Morroco Ridge on other side has savanna or forest on steep slopes. Much rock showing.

Open forest on basal slope.

Another valley with irregular forest-scrub mixture. Palms locally. Dos Caminos.

Deciduous forest and scrub forest rather microphyllous. Hilly country, now covered by rather irregular microphyllous deciduous forest.

All of this forest, from Calabozo, has been green, but undoubtedly deciduous.

Now it is less green, locally bare.

Locally it is open and grassy. Ditch.

Valley with some flat areas which are cultivated. Otherwise with deciduous forest + scrub, locally thorn scrub.

Becomes more and more bare ^{of leaves} as terrain becomes more

hilly. some hills bare and grassy or partly so.

Parapara - hills are mostly grassy and brown, with or without scattered trees.

Broad flat valley has open deciduous scrub or scrub forest.

Hills now covered by open decid. forest; closed in valley and ravines. Stream in valley dry.

Hills vary from open forest to savanna dense in ravines.

Then hills to left show typical curatella savanna, varying to grass without trees - valley scrub forest, partly cleared for cultivation.

El Manguito

Climbing along a ravine, wooded in bottom, savanna on both slopes.

Becomes more bushy toward top.

Fundo La Cruzeta

Los Flores.

Upper slopes degraded and bushy, eroded.

Wooded in ravines.

Is rush on these slopes is

tangled with a great mass of ~~ladder~~ herbaceous vines now completely dry.

San Juan de los Moros. From here to ~~the same~~ ^{Villa de Cura} same road as described on pp.

Spectacular limestone pinnacles and crags.

Tangled scrub and cultivation.

Limestone hills thickly wooded on upper slopes, shifting cult. on lower. Flat land in valley cult. except narrow gallery on river banks. A little water in river.

Not sure that these peaks are limestone - have the appearance also of remnants of a great igneous dike - very straight sides, arranged in a row.

Hills now savanna covered, or bare. flat valley bare, ravines wooded.

Villa de Cura.

Rd to San Francisco de Asis. a rough dirt rd. then cultivation - maize, cane, etc.

No, this merely led back to highway to

S. F. de Asis. Follows valley
bet. hills covered with
curatella savanna.

San Francisco de Asis.

Hills to left are grassy
with string of woods in
ravine, anastomosing below in wooded
gullies.

Came out onto plain,
mostly cane plantation.

Lower slopes deciduous forest.

Field separated from
road by hedgerows of small
tree. Some fields are
fallow, also lined by trees.

Puerta Negra.

Large trees line road to Maracay.

Large vineyard on left,
probably of Passiflora, strung
upon wires.

Small ravine beyond
Pala Negra.

Fallow fields with scattered
large Llaneros.

Camburito

Santa Rita

Extensive fallow fields.
Some flower.

El Guareto.

Broad dome shaped
Llaneros are the outstanding
feature of the landscape.

May 19 - Estacion Biologica, Reserve,
near Calabozo.

small island of forest
in ~~open~~ savanna.

- 45322 *Guettarda elliptica* Sw.
2 one of commonest plants in
2 23 *Randia*
occasional in
2 24 *Guettarda elliptica* Sw.
one of commonest plants in
2 25 ~~Casahuate~~ *Erythroxylum* det. Steyermark², 1980
occasional in edge of
2 26 *Cordia chacoensis* Chodat
occasional just outside of
1 27 (rub.) *Henipa* sp. det. Kuhnide, 1977
under *Curatella* tree in
savanna

same - in small clump of
trees on deep compact
mottled soil in savanna

- 3 28 *Smilax*
2 29 *Vochysia venezuelana* Stalfen
said to be indicative of
this soil type
3 30 *Xylopia aromatica* (Lam.) Mart.
occasional
same - in small clumps of scrub in
2 31 *Eugenia*
very common in clumps
of scrub or forest in
savanna
1 32 *Annona chirimolia* L.
occasional

shrub 3 m. tall.

shrub 2 m. tall.

shrub 2 m. tall,
fruit dry.

shrub 1.5 m. tall; fruit immature.

shrub 1 m. tall; flowers white.

sterile small plant.

vine climbing in bushes
sterile tree 8 m. tall,
leaves glossy above,
yellow green.

slender shrub, sparsely
branched 4 m. tall; flowers
white, fading yellowish.
shrub, aromatic when
broken.

shrub 1 m. tall.

45333

Lida

occasional

1

34

Casearia

occasional

May 19 - San Juan de los Moros

1

35

Lippia

Est. Guárico

flowers pale pinkish with
yellow centers.May 19 - near Palo Negro,
Fago de Valencia, Est. Aragua
roadside

1

36

Heliotropium parviflorum

3

37

Boerhavia diffusa L.
common onMay 19 - Estacion Biologica
Reserve, ^{near} Calabozo, Est. Guárico

3

38

Casearia

in clump of scrub in
savannasuffrutescent herb, 1 m. tall.
— strongly aromatic.
shrub, 1 m. tall, fruit
immature.much branched
suffrutescent herb.
flowers white.— stems prostrate,
forming a loose mat,
inflorescence ascending.shrub 1.5 m. tall, fruits green,
turning black.

May 22 - in the Canoe -
New York

South coast of Puerto
Rico ~~30~~ mi. e. of Ponce.

A lagoon surrounded by
a festoon of islets, on shore
a mangrove swamp with
tidal channels, inland
from this a patchwork
of cultivated fields.

Inland from this and
extending across the
island an intricate pattern
of hills, mostly cleared,
but having perhaps 15-20%
of wood remaining.
On the lowland, part of
coastal plain with in
sugar cane, but with patches
of mangrove in it.

May 27 - Great Falls,
Potomac River
in rocky area at edge
of second-growth woods

45339

3

very local

2

40

Senecio

local

1

41

Krigia virginica

very local in rock crevices

1

42

Euonymus americana
occasional

2

43

same - in wood
Ilex

rare

5

44

Ptelea trifoliata

common

1

45

Euphorbia

common

1

46

Tradescantia virginica
occasional in shade

ca. white, spikelets
- deep purple
flowers deep yellow

shrub to 2 m. tall,
flowers slightly bronzed
light green.

shrub 2.5 m. tall,
- flowers white
shrub, flowers pale
green, ill-scented.

roots fleshy, yellow;
flowers curved downward.

May 3 - Alexander Range
Memorial Sanctuary

Plants seen

Asplenium platyneuron
Pinus strobus
Ilex opaca
Mitchella repens
Rhus typhina
Lonicera galearifolia
Botrychium virginicum
Liquidambar styraciflua
Galium triflorum
Chionanthus virginicus
Lonicera reticulata
Podophyllum peltatum
Woodwardia virginica
Arisaema triphyllum
Lonicera galearifolia
Athyrium filix-femina
Carex acutiformis
Acer rubrum
Hamamelis virginica
Sambucus canadensis
Rubus argutus
Lysichiton ciliatus
Cimicifuga racemosa
Platanus occidentalis
Ranunculus abortivus
Botrychium virginicum
Polystichum acrostichoides
Geranium phaeum
Parthenocissus vitacea
Robinia pseudoacacia

Gleditsia triacanthos
Kalmia latifolia
Corylus americana
Rhus typhina
Asarum canadense
Carex
Juncus roemerianus
Acer negundo
Verbena dentata
Asarum canadense
Ilex verticillata
Salix
Asimina triloba
Lilium
Quercus palustris
Castanea vesiculosa
Vitis rotundifolia
Peltandra virginica
Cornus amomum
Proserpinaca
Polypodium virginicum
Asarum virginicum
Juncus effusus
Betula nigra
Krigia virginica
Stellaria media

Hooded warbler.
redstart
pileated woodpecker
~~Rhodod.~~

vacuum
box tortoise

Shrub layer on
steep north facing
wall of ravine covered
with Rhododendron
maximum, some Kalwinia.
practically nothing on ground.

Flat bottom of ravine
dominated, in shrub
layer, by *Linnaea*,
much *Carpinus*, *Sambucus*,
on ground *Lymnocarpus*,
Cirsium, *Podophyllum*,
Rhus etc. *Athyrium*,
Arisaema, *Parthenocissus*,
Impatiens, *Urtica*, *Wernstedtia*.

Lower down the ravine I found
a lower layer of forest.

Stream of brown water
on clear bed of fine gravel.

There is a large dried
beaver impoundment.
a bit lower down is an
opening with several
very large taller *Betula* trees.
Below that a thicket of small
Betula trees.

Then a large beaver dam.

The meadow is very
luscious, mostly grass
& *Agrostis* in flower.

Plants in meadow

- a *Polygonum*
- c *Lythrum*
- c *Ranunculus*
- c *Crucifera*
- c *Geranium*
- c *Trifolium*
- a *Glechoma*
- c *Plantago*
- c *Festuca*
- o *Plantago rugelii*
- o *Megacodon*
- c *Cerastium*
- o *Vicia*
- o *Erigeron*
- c *Beta*
- o *Taraxacum vulgare*
- la *Rumex acetosella*
- o *Drachena indica*
- o *Vicia*
- c *Quercus*
- ac *Rumex crispus*
- o *Rumex obtusifolius*
- c *Juncus*
- c *Rubus*
- o *Trifolium pratense*
- o *Chrysanthemum leucanthemum*
- la *Allium vineale*

Around the beaver pond
is a fringe of *Sium*.
The water is high and
the dam is in good
repair.

On low bank, between
beaver pond & stream
is open wood.
Rosa multiflora
Alternanthera
Glechoma
Ranunculus

- o *Artemisia artemisiifolia*
- o *Compositae*
- la *Urtica dioica*
- la *Juncus effusus*
- o *Lepidium virginicum*
- o *Lactuca*
- la *Thodanis biflora*
- o *Lactuca scariola*

May 31 - Belvedere Penny Farm,
Rappahannock River 5 mi.
below Fredericksburg
45347 *Geranium molle* L.
local in grassy corner of field

May 31 - Alexander Berger
Memorial Sanctuary,
Rappahannock River, 5 miles
below Fredericksburg
in bottomland meadow
3 48 *Fraxinus tomentosa* Michx. f.
occasional isolated tree

2 49 *Rumex crispus* L.
occasional

3 50 *Achillea millefolium* L.
occasional

3 51 *Diospyros virginiana*
occasional isolated tree

1 52 *Lepidium virginicum* L.
common in thinner places

1 53 *Vicia angustifolia* var. *segetalis* (Thunb.) W.D.J. Koch
occasional

1 54 *Lithospermum arvense* L.
rare

1 55 fungus
common on *Rubus* sp.

3 56 *Erigeron annuus* L.
occasional

2 57 *Rumex acetosella* L.
locally abundant
forming large patches

1 58 *Carex*
occasional

flowers ^{are} purple.

small tree

erect

rays white; plant
aromatic.
small tree 8 m. tall,
flowers white, waxy,
erect, flowers whitish.

ascending; flowers
magenta.
erect, branched.

light orange

rays white.

flowers reddish yellow.

culms solitary,
ascending.

- 45359 *Salvia lyrata*
locally common
- 1 60 *Trifolium repens* L.
common
- 1 61 *Plantago lanceolata* L.
occasional
- 1 62 *Juncus tenuis* Willd.
occasional
- 2 63 *Rumex obtusifolius*
occasional
- 1 64 *Plantago virginiana*
common
- 2 65 *Ranunculus bulbosus* L.
common
- 1 66 *Cerastium semidecandrum* L.
common
- 1 67 *Poa*
common
- 1 68 ~~Glechoma~~ *Glechoma hederacea*
very common
- 2 69 *Bromus japonicus*
abundant, dominant plant
- 2 70 *Bromus*
common
- 1 71 *Veronica peregrina*
common
- 1 72 *Myosotis verna* Nutt.
common locally
- 2 73 *Poa*
abundant
- 1 74 *Geranium carolinianum* L.
var. *consectum* Fern.
very common
- 2 75 *Oxalis stricta* L.
common

flowers white.

1 45364a *Trifolium*

flowers yellow

petals yellow.

erect

prostrate; flowers purple.

erect

120

1964 Virginia

~~45775~~
45776same - sandy area
Oenothera laciniata
common locally

77

same - edge of beaver
pond, wet ground
Carex lucida

1 77

common

1 78

Juncus effusus L.
common

2 79

Sisyrinchium
commonMay 31 - Alexander Berger
Memorial Sanctuarylower Snow Creek
on bottom - land flats
Stellaria media

1 80

common

3 81

Viola

common locally

1 82

Fraxinus cf. *tormentosa* Michx.f.
common

1 83

Duchesnea indica
occasional

1 84

Triodanis ~~triflora~~ perfoliata
rare

1 85

Asimina triloba
occasional

1 86

Viburnum prunifolium
occasional

2 87

Ranunculus abortivus
occasional.

Spottsylvania Co. 121

flowers yellow, turning
reddish.

a spitor.

flowers blue-violet;
roots yellow.

forming loose mats.

stems erect

very tall tree

prostrate; fruit red, fleshy

flowers deep violet.

shrub 3 m. tall (others
much taller), sterile.
shrub; fruit green.

45388

Carex

4

local

2

89

Oxoclea sensibilis

rare

2

90

Festuca obtusa

occasional

1

91

Allium vineale L.?

rare

1

92

Epipagus virginianus

rare, under beech tree

2

93

Festuca

local, on mossy banks

2

94

Peltandra virginica (L.)

occasional

Schott. & Endl.

2

95

Acer negundo L.

common

1

96

Vitis labrusca?

local

2

97

Viburnum recognitum Fern.

common

1

98

Cornus amomum Mill.

occasional

1

99

Corydalis flavulus

occasional

45400

Viola rafinesquii

3

local

1

400a

Kizia virginica

rare in opening

same - on lower part of steep north slope in woods.

5

01

Kalmia latifolia

at base of slope in very wet ground

3

02

Penstemon racemosus

local

tufted culms weak,

sterile.

~~culm~~

culms weakly ascending

leaves strongly compressed,

with sharp edges.

dry, last year's plant.

erect; ~~sp~~ spath, green,

ill-scented.

small tree (other, larger)

inflorescence pendent.

sterile vine.

shrub 2 m. tall.

sprawling to ascending

shrub; buds only.

stems weakly ascending

to procumbent.

shrub 2 m. tall; flowers

white.

shrub 1 m. tall

45403 *Rhododendron maximum*
4 locally dominant

same - in flat ravine
bottom in dense woods

1 04 *Corylus americana* Walt.
occasional

1 05 *Ranunculus*
in wet ground

1 06 (grass)

rare

2 07 *Lindera benzoin*
dominant in shrub layer

3 08 *Ilex verticillata*
rare in shrub layer

1 09 *Ilex opaca* L.
common

1 10 *Galium aparine*

rare

2 11 *Botrychium virginianum* L.
occasional

1 12 *Botrychium dissectum* f. *obtusifolium* var.
rare

1 13 *Ranunculus*
rare

1 14 fungus
on *Podophyllum peltatum*

1 15 *Carex*
in wet spot

1 16 *Platanus occidentalis*
occasional

1 17 *Sambucus canadensis*
rare in small opening

1 18 *Rubus*
abundant in small opening

shrub 2 m. tall.

sterile shrub 1.5 m. tall.

aromatic shrub 2.5 m.
tall; fruit immature.
shrub; bud only.

small tree, 5 m. tall.

weakly ascending.

leaflets reddish green.
sterile.

Tall tree

shrub 2 m. tall; flowers
white.
canes high arching.

- 45' 119 *Athyrium filix-femina* f. *rubellum*
very common
- 1 20 *Dennstaedtia punctilobula*
locally abundant
- 1 21 *Rubus*
f. rare
- 2 22 *Arisaema triphyllum* L.
common
- 1 23 *Stellaria* cf. *rubra* Michx.
occasional
- 1 24 *Lonicera japonica* Thunb.
abundant
- 1 25 *Woodwardia virginica*
common
- same - sides of ravine
- 2 26 *Ulmus americana*
- 2 27 *Ulmus americana*
- 1 28 *Juglans cinerea*
occasional
- 4 29 *Carpinus caroliniana*
very common

sachines reddish.

flowers white.

leaves clear green beneath
spathe deep purple
within, green without.

vine, flowers white,
turning deep yellow,
very fragrant.

young plant sterile.
young plant sterile.
small sterile tree.

shrub 4 m. tall;
inflorescences pendent or
drooping.

labels
some

June 3 - Washington
back of Smithsonian Institution

45430

Catalpa

planted

2

large spreading tree,
flowers white, 3 lower
lobes marked inside
with purple & yellow
spots on lower lobe
beside 3 purple lines.

June 6 - Dickey Hill,
just below Shenandoah
Valley Overlook, on Skyline Drive
in rather poor
second growth forest on
moderate slope

45431

Acer negundo

6

locally common

4

32

Vitis cf. vulpina L.abundant along drive,
climbing over trees

2

33

Carex

common in old trail

1

34

Actinomeris alternifolia (L.) DC.
occasional

2

35

Euphorbia obtusata L.

common in old trail

3

36

Osmorhiza longistylis
abundant, forming a
continuous herb layer

4

37

Arrhenatherum elatius (L.) Presloccasional on old trail
(seen abundantly along drive)

3

38

Fraxinus americana

common

3

39

Viburnum prunifolium

occasional

1

40

Geranium columbinum L.
occasional on roadside
in sun

tree about 8 m. tall

large vine

loose tufts, ~~tuft~~ culms
depressed.erect, to 7 dm tall, sterile at
this season. resinous -
aromatic when broken.glands greenish yellow,
not red.erect, with licorice
odor when broken

erect, loose tuft.

tree 10 m. tall,

small tree, 5 m. tall,
fruits immature.~~prostrate~~ decumbent;
petals rose purple.

June 6 - Ridge bet Skyline
Drive and The Neighbor
on rocky ridge with
thin ~~to~~ stunted oak forest
Lilene caroliniana

45-441

12

3

42

Vitis

on open rock ledges

1

43

Rosa carolina

common

1

44

(grass)

occasional in semi-open place

1

45

Ceanothus americanus

very common

2

46

Carex

uncommon

2

47

Vitis aestivalis Michx.

occasional

5

48

Heuchera

common

2

49

Vitis aestivalis Michx.

occasional

4

50

Comandra umbellata

locally common

June 6 - The Neighbor,
on and near summit,
in thin oak woods

3

51

Alliaria officinalis Andrz.

large colony on summit

3

52

Carex

uncommon

depressed; flowers

— already faded.

low vine

with curious galls.

sub-shrub, buds only.

dense tufts, culms

— weak, procumbent.

vine scrambling

— on ground and bushes.

scapes erect, ~~st~~

— petals, anthers orange.

vine, tangled on

— rocks.

spreading colonies

connected by cord-like

subterranean rhizomes

flowers white.

erect herb.

caespitose

- 45453 *Carex*
occasional
- 3 54 *Asclepias quadrifolia*
common
- 2 55 *Polygonatum*
occasional on slope
- 5 56 *Carex*
common
- 2 57 *Heuchera*
occasional
- 4 58 grass
common
- 4 59 *Rubus*
locally common.
- 4 60 *Carex*
very common along trail
- 1 61 *Carex*
common
- 2 62 *Geranium maculatum*
common
- 1 63 *Arabis*
rare
- 2 64 *Lanicula*
occasional
- 1 65 *Galium aparine*
occasional
- 3 66 *Amelanchier*
occasional
- 2 67 *Hieracium venosum*
common
- 1 68 *Viola pubescens* dit.
rare in grassy place
- 1 69 *Carex*
local in rocky place

- caespitose
- flowers pinkish white
- flowers greenish white,
— past anthesis.
- small tufts, culms
— very ~~erect~~ erect.
- culms erect to slightly
— arching; petals white
- tufts, culms weak,
— procumbent.
- tufts
- petals rose purple.
- flowers greenish.
- small arching tree,
— fruits not quite mature.
- leaves red-veined; flowers yellow
- erect
- culms decumbent

136

1964 Virginia

~~45470~~ June 6 - ridge from
to the neighbor
in thin stunted oak forest

45470

Vicia

common

81

71

Arabis

rare

81

83

72

Vicia

common

~~73~~

June 6 - Skyline Drive
near mile post 27

on thinly weedy sloping
road cut.

81

73

Pyrola rotundifolia var
americana

small colony

81

74

Antennaria

common

same - in forest

81

75

Betula lenta

common

Shenandoah
State Park

137

stems weakly ascending
erect, flowers greenish.

stems weakly ascending,
flowers magenta.

buds only; plants
connected by horizontal rhizomes.

spreading colony.

tree 15 or more tall,
bark dark.

June 7 - Elk Wallow shelter
in somewhat disturbed
ground in mixed deciduous
~~forest~~, with some pine and hemlock

45476

Viola triloba Schw.

3

common, especially near path

1

77

Potentilla simplex Michx.

occasional

1

78

Viola palmata L.

rare along path

1

79

Viola pubescens Ait.

rare

3

80

Viola

common

3

81

Chelidonium ~~maius~~ L. ?

occasional

1

82

(fern) *Athyrium filix-femina* (L.) Kuhn

local in deep shade

1

83

Stellaria pubera Michx.

common

1

84

Corydalis flavula

rare along path

2

85

Viola

common

3

86

Barbarea vulgaris R.Br.

occasionally along path

2

87

Viola

common

1

88

Dentaria laciniata Thubl.

occasional

2

89

Viola

common

2

90

Oxalis corniculata var. *filipes* flower
occasional

leaves erect pedicel

sap red; petals yellow, falling
— quickly, less than 1 cm. long.
sterile, fronds not erect.

fruiting stems procumbent,
sterile ones erect.

erect.

erect, flowers yellow

Salish.
dit 75
L. m. t. g.

not checked
140

1964 Virginia

labels typed
45491

Viola

common

92 Oxalis

occasional

93 Geranium robertianum L.
rare

94 Aquilegia canadensis
occasional

95 Veronica officinalis
common

96 Oxalis florida Salisb. det.
rare

97 Saxifraga virginiana
local on bare ground

98 Ranunculus
rare along path

99 Ranunculus abortivus L.
common

45500 Ranunculus
common

01 Carex
common

02 Ansaema atrovirens (L.) B.
rare

03 Asarum claytoni
common

04 Botrychium virginianum
common

05 Carya cf. ovata (Mill.) Koch
common

Shenandoah Nat. Park 441

erect, flowers yellow.

flowers rose pink.

sepals and spur scarlet,
rest of flower yellow.
prostrate; flowers
pale lavender lined with
purple.

erect, flowers yellow.

erect

culm weak

leaves glaucous
beneath; spathe dull
maroon lined with white.

tree 20 m. tall; catkins
pendent, dropping
bark tending to exfoliate
but not conspicuously shaggy.

June 7 - Elk Wallow Picnic Ground
at edge of parking lot

45506

Poa

abundant

13

Ola Lepidium

common

same - along path in woods.

12

07

Viola palmata L.

common

June 7 - Little Devil Stairs
Parking Overlook, Skyline
Drive

grassy roadside

1

08

Festuca

occasional

12

09

Lychnis

rare

12

10

Cerastium

common

12

11

Convolvulus spithameus

local

1

12

Laguna

occasional

1

13

Stachys?

common

June 7 - Jimmie Gray
Fire Road near Skyline Drive

4

14

Barbarea

common along road in forest

a number of stems from
root crown; petals white.
leaves dark green.

very deep-rooted; flowers
white.

flowers rose-pink. Plant
aromatic.

erect

144

1964 Virginia

Shen. Nat. Park.

145

June 7 - Jimmy Gray Fire

Road, above Little Devil stairs
in second-growth hardwood
forest.

2900'
884m

45515 *Athyrium? thelypteroides* (Michx.) Desv.
common

13 16 *Hydrophyllum macrophyllum* Nutt.
common

13 17 *Saxifraga micranthodifolia* (Haw.) Britt.
abundant in wet soil
below spring

flowers white.

petals white.

June 7 Jimmy Gray Fire Road
below Little Devil stairs Trail
~~road~~ in forest

2600'
792m

13 18 *Scrophularia lanceolata* Pursh
common on road embankment

1 19 *Lonicera*
rare on road cut

1 20 *Ligusticum*
occasional on road cut

1 21 *Ligusticum*
occasional on road cut.

erect; corolla greenish-brown.

flowers greenish white

rather glaucous.

June 7 - Jimmy Gray Fire road
just above junction of Keyser Run
Fire Road,
in mixed pine and hardwood

2000'
609m

45 22 *Vitis* forest

at edge of right-of-way clearing

1 23 *Carex*
occasional

1 24 *Potentilla simplex* Michx.
common along road

large liane

procumbent; petals yellow.

146

1964 Virginia

- 45525 *Galium triflorum*
common
- 1 26 *Botrychium virginianum*
common
- 12 27 *Viola*
common
- 1 28 *Oxalis florida* Julist. det. Lowrey, 75
occasional
- 3 29 *Viola triloba* ~~det.~~ Schwa
common
- 1 30 *Ranunculus abortivus* L.
occasional
- 4 31 *Lindera benzoin*
locally very common,
forming a shrub layer
- June 7 - Jimmy Gray Fire Road,
above Piney Branch Trail,
on small tributary of Piney Branch
- 4 32 *Carex*
low ground near stream
- 1 33 *Viola canadensis* L.
occasional in low ground near stream
- 13 34 (grass)
common in low ground near stream
- 4 35 *Carex*
in low ground near stream
- 13 36 *Bromus*
common in road
- 1 37 *Cerastium*
common in road
- 1 38 *Galium aparine*
occasional in low ground

Shen. Nat. Park

147

procumbent.

flowers yellow.

shrub 2 m. tall,
aromatic when broken;
fruit immature.

490

small tufts

glaucous, culms weak.

isolated culms or very
small tufts.

procumbent.

148

1904 Virginia

labels typed
HK

June 7 - Piney Branch,
at edge of Park, Thornton River
in irregular rocky bottom
land, with hemlocks
and hardwoods.

45539 Rosa

in tangle below road

40 *Thalictrum*
common

41 (grass)

common

42 *Arabis*

occasional on rocks
at edge of stream

43 *Galium latifolium*
on mossy bank

44 *Panicum*

occasional

45 *Thalictrum dioicum* L.
rare, one seen.

46 grass

common

47 *Viola*

near edge of stream

48 *Euphorbia*

occasional

49 *Viola*

common near edge of stream

50 *Cryptotaenia canadensis*

rare along road

51 *Rhus toxicodendron* L.

common

Shen. Nat. Park

149

1200'
Drainage

arching bush, fruit green.

herb 1 m. tall, leaves
glaucous beneath.
small tufts, erect.

flowers reddish.

small tuft

erect

scrambling vine

150
Labrador
Hb.

1944 Virginia

June 7 - Keyser Run Fire Road, just inside Park boundary in second growth forest

45552 *Arisaema atrorubens* L.
occasional

✓ 1 53 *Goodyera pubescens*
occasional

✓ 1 54 *Oxalis*
rare

✓ 1 55 *Galium circaezans*
rare

June 7 - Flat area at intersection of Gray Line Road and Keyser Run Fire Road at about 2200. Largely covered by almost pure stand of *Panicum* with some *Setaria*. Could be an old plantation.

Very little grass and vegetation. Some *Parthenocissus*, a few *Rhus typhina*, little else but a large amount of

Shen. Nat. Park

151

1400 ft

leaves glaucous beneath, spathe green.

leaves dull green, with white veins. flowers yellow.

flowers greenish.

June 8 - Ridge to the Heights is a round topped ridge with poor *Quercus prinus* forest here and there some shrub layer of *G. ilicifolia*.

Ground vegetation rather thick. Near Blue Ridge end, *Vaccinium vacillans* and other *Ericaceae* abundant.

Less as you go out. *V. coccinea* very common. *Linnaea borealis* standing. A number of *Ceanothus* very common.

Asclepias quadrifolia common.

Occasional outcrop of a dark sandstone.

June 14 - 12:40 a.m. -
 Gore
 On hill on north side of road
 a large colony of *Quercus*
 in full bloom. Hill is
~~covered with~~
 grassy, a dark shale
 & dark limestone.

June 14 - Mts. surrounding
 Gore are densely forested.
 (Summit of Mt. S. is bare.)

Road to north, through
 a valley with
 mixed second growth.
 Road cuts over shale &
 much Allapaha.

Pine, esp. *V. virginiana*,
 being cut for pulp wood.
 East Day Scout camp and
 reservation.

Kalonia in flower.
 Back Creek Valley. Flat
 fields in bottom are cleared
 and pastured. Scattered
 houses and old hotel.

W. Va. boundary.
 Shortly after, turned
 left on a small road
 through rather younger
 second growth, toward
 Great North Mt.

at corner of Lucas land
 an area where *Kalonia*
 is very abundant, but
 small.

Small oak - *Quercus*
 with young tulip poplar
 red maple, chestnut
 spruce, much spruce
 sassafras, corylus.
 Much dead chestnut.

a

occasional

american

b.

dark

very low on ground

- its

small

along

- 1

fair

~~45379 (1)~~

45554 (1)

1964

Virginia

June 14 - 12:30 noon

Fore
On hill on north side
a large colony of *Opuntia*
in full bloom. Hill is
~~mostly limestone~~

~~with some grass~~
grassy, a dark shale
or dark limestone.

June 14 - Mts. surrounding
Gore are densely forested.
(June 14 at Gore Station.)

Road to south runs
through a rather small
mixed second growth.
Road cuts are shale.
Much *Asplenium*.

Pine, esp. *V. virginiana*,
being cut for fuel and
for the Boy Scout camp and
reservation.

Kalonia in flower.
Back Creek falls. Flat
fields in bottom are cleared
and pastured. Scattered
houses and old hotel.

W. Va. boundary
Shortly after, turned
left on a small wood road,
through rather younger
second growth, toward
Great North Mt.

Frederick Co.

at corner of Lucas land
an area where *Kalonia*
is very abundant, but
small.

Small oak, but mostly
with young tulip poplar
and maple, chestnut
sprouts, much young
sassafras, *Corylus*.
Much dead chestnut.

Tree: *Lilia**sassafras**Quercus coccinea**G. prinus**Praxinus americana**Carya* sp.*Liriodendron**Acornus* (one seen on 5/14)*Petalostemum**Pinus virginiana**Quercus rubra*

Second story

*Cornus**Cercis**Myrica**Juniperus communis**Robinia**Carpinus*

Qualit

Maple

Pine

Robinia

Myrica

Prunus

Shrub 10 ft.
Corylus americana
Larrea tridentata
Juniperus communis
Abies balsamea

Rubus
 Rubus
 Rubus

Vitis
Vitis

Castanea
 Castanea
 Castanea
 Castanea
 Castanea

Menyanthes

Salix

Vaccinium vacillans

Robinia pseudo-acacia

Amelanchier

Gaylussacia baccata

- a *Galium aparine*
- b *Polypodium acrostichoides*
- c *Podagracea pubescens*
- c *Geranium maculatum*
- d *Rosa pratincola*
- c *Portulaca oleraceae*
- c *Lonicera racemosa*
- c *Cypripedium calceolus*
- d *Adiantum pedatum*
- c *Galium triflorum*
- c *Circaea quadrangula*
- a *Saxifraga oppositifolia*
- Desmodium illinoense*
- Asarum canadense*
- Hedysarum virginicum*
- Hieracium virginicum*
- Cypripedium virginicum*

205

upper slopes in scrubby
 forest of *Quercus prinus*
 on almost bare soil
 much fallen *Abies*

generalized soil

Land *Quercus*
Clinch & *Bell*
 Winchester
 (bbs. contract)

Fire came through
 19-20 years ago
 Low *Staphylopodia*
 show *Staphylopodia*

grove of small *Pinus*
virginiana to 20 cm dbh
Abies balsamea
 abundant, to 30

in corner - *Kalmia* &
Menyanthes abundant
Taxodium

Potentilla
Rubus
Chamaenerion
Fragaria

Ravine north of stream
~~Large~~
 Potatoes
 Beans
 Corn
 Calluna
 Alnus
 Ilex
 C. ...
 Rubus

4.2 mi. from Gore

1.8 mi from main rd.

Lucas property - one corner
 project ...
 ...

Hugh

Road tract across road
 23 acres. ...
 large bluff.

mean
 Bayne
 ... (Springfield Farm, Ind.)
 RFD #2 Germantown Ind.
 area above Lucas tract is
 56 acres. Small stream
 comes from there.

158
check
158
check
158
check

1964 Virginia

June 13 - west slope of
Great North Mountain,
south of Gore
in second growth forest

- 45556
✓ 2
✓ 2 57
✓ 2 58
✓ 1 59
✓ 1 60
✓ 2 61
✓ 2 62
✓ 2 63
✓ 1 64
✓ 1 65
✓ 1 66
✓ 1 67
✓ 2 68
- Panicum
in old abandoned road
Panicum
common in old abandoned road
Carex
occasional in old abandoned road
Amelanchier [Discarded -
occasional [adequate spec.]
Ostrya virginiana
occasional near stream
Lysimachia
local on wet ground
Dennstaedtia punctilobula
locally abundant
in moist places.
Streptopus roseus
very local in ravine
Alnus serrulata Willd.
very local in wet ravine
Lycopodium lucidulum Muhl.
abundant colony
in wet ravine.
Oenothera perennis L.
rare in old road.
Carpinus carolinianus
occasional in ravine
Conopholis americana
very abundant locally
under Quercus rubra

Frederick Co.

159

815-830 m.

several culms from
base, erect.
small tufts, erect.

procumbent shrub,
sterile.
tree 8 m. tall; sterile.
flowers yellow.

shrub 2.5 m. tall.

flowers yellow
sterile large shrub.

1944 Virginia

160

45569

✓ 2

✓ 1

✓ 2

✓ 4

✓ 1

✓ 1

✓ 2

✓ 1

✓ 1

✓ 2

✓ 1

✓ 1

✓ 2

✓ 1

✓ 1

✓ 2

✓ 2

✓ 2

✓ 1

✓ 2

✓ 1

✓ 2

✓ 1

✓ 2

✓ 1

✓ 2

✓ 1

✓ 1

✓ 1

✓ 1

✓ 1

✓ 1

1944 Virginia

Kalmia latifolia

locally very abundant

Hamamelis virginiana L.

occasional

Asclepias quadrifolia

occasional

Galium latifolium Michx.

common

Carex

rare

Vitis

common

Juglans cinerea

occasional, on

rocky slope

Chimaphila maculata

occasional

Carex

occasional

Acer nigrum var. *glabrum*

rare

Menziesia pilosa

common

Carex

occasional

~~*Hypoxis*~~ *Monotropa hypopitys*

rare

Rubus flagellaris

occasional on thin soil

Spiraea betulacifolia & *corymbosa*

very local on thin soil

Hieracium venosum

rare

Frederick Co.

161

shrub 1 m. tall, flowers

very pale pink.

sterile shrub.

flowers pinkish white.

roots yellow; flowers
maroon.

woody vine, climbing
in trees, leave slightly
pale beneath.

Tree 10 m. tall, 15 m.
thick; nuts on ground.

leaves dark green,
marked with pale.

large tree; leaves
slightly glaucous beneath.

shrub 0.7 m. tall,
leaves very slightly
glaucous beneath.

culms procumbent,
leaves green.

pale yellowish white.

primocanes ascending,

floricanes almost prostrate

sterile

leave red-veined; heads yellow.

Labels type xx

45585 *Hedyotis purpurea* v. *longifolia*
occasional

✓ 1 86 (fern) *Dennstaedtia punctiloba* (Michx.) Moore
very local

✓ 1 87 *Potentilla*
occasional

✓ 1 88 *Dryopteris marginalis* (P. A. Gray)
rare

✓ 1 89 *Carex*
occasional

✓ 1 90 *Festuca obtusa*
~~occasional~~ rare

✓ 1 91 *Galium circaezans*
occasional

✓ 2 92 *Botrychium virginianum*
common

✓ 1 93 (fungus) *Polyporus umbellatus* Pers. ex Fr.
rare in dead leaves

flowers almost white.

fl

fl

fr

fl

cu

fl

(spe
fr

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
CROPS RESEARCH DIVISION
BELTSVILLE, MARYLAND

June 18, 1964

To: F. R. Fosberg

From: C. R. Benjamin
Mycology Investigations, CPRB, CRD *C. R. B.*

Subject: Identity of Fungus, per your memo dated June 14, 1964

The fungus that you recently sent to us as No. 45593, collected in deciduous woods on Great North Mountain, has been examined and identified by Mr. J. A. Stevenson, who found it to be Polyporus umbellatus Pers. ex Fr. The family name is Polyporaceae. This particular species of polypore is a fleshy type and was partly decomposed when received. Unfortunately, therefore, it had to be discarded.

Plants of VIRGINIA

Frederick County

Polyporus umbellatus Pero. ex. Fr.

Locality West slope of Great North Mountain,
south of Gore.

Occurrence Rare in dead leaves in second
growth forest.

Date June 13, 1964 Alt. 815-830 m

Coll. F. R. Fosberg No. 45593

Remarks (specimen discarded by people at
Beltsville).

162

1964 Virginia

45585 *Hedyotis purpurea* v. *longifolia*
occasional

86 (fern) *Dennstaedtia punctiloba* (Michx.) Moore
very local

87 *Potentilla*
occasional

88 *Dryopteris marginalis* (L.) A. Gray
rare

89 *Carex*
occasional

90 *Festuca obtusa*
~~occasional~~ rare

91 *Galium circaezans*
occasional

92 *Botrychium virginianum*
common

93 (fungus) *Polyphorus umbellatus* Pers. ex Fr.
rare in dead leaves

Frederick Co.

163

flowers almost white.

sterile

flowers yellow.

fronds strongly
ascending, glaucous
beneath.

culms ascending.

flowers pale green.

(specimen discarded by
people at Beltsville).

June 20 - Powdermill Reserve

New road property
for Museum & nature center.

Old farm land.
Small wood, is all apple
on slopes from many a few
to closed thickets. Open
at top with a few
Corylus, etc. Very thin
stratification.

Low belt of patches of
wood and open fields.

June 21 - small community
about south of Berlin about
3 mi.

Low, open, mostly
dry, slightly dry
with various Ca. sp.

Juncus effusus, etc.

Meadow with mixture
of Solids, etc. & much

Equisetum arvense

Clump of Alnus incana?

June 21, Tring, Swamp

Garrett Co.

2 mi. n. of Gaithersburg

7700'

Where next to low road
crossing there is a

scrub of Vaccinium
corymbosum, Arctostaphylos,
Alnus, etc. ~~etc.~~

Rhododendron maximum,
Nemophanthus, etc.

about 2 m. tall, varying
from rather loose to dense
with scattered trees, to

10 m. of dense, hard wood,

Pinus strobus, Betula sp.

alleghaniensis, Nyssa

magnolia arborescens.

Alnus as dominant on
east side, mostly near

A. melanocarpa, Viburnum acerifolium.

Here ground covered by

Symphlocarpos, Glycyrrhiza

Ca. or sp. etc. etc.

young Sambucus racemosa

Ground dominated by

Thelypteris palustris

Dracopis

Galium

Calluna

Rosa palustris

labels typed
JKH

June 21 - ~~2~~ 2 1/2 mi. s. of
Berlin

in marshy ground

45594

V 4

Stellaria graminifolia
locally common

V 2

95

Oenothera
very local

X 1

96

Equisetum arvense var. *brevifolium*
abundant

V 2

97

Prunus virginiana

V 4

98

Alnus ~~incana~~ rugosa (DuRoi) Krs.
common

~~June~~ Maryland

June 21 - Fingel Swamp,
2 mi. n. of Frostburg
in scrubby swamp

X 1

99

Caltha palustris
rare in shade in water.

V 2

45600

Pyrus (Aronia)
occasional

X 1

01

Lyonia ligustrina
occasional

X 3

02

Amelanchier
common

V 3

03

Pyrus (Aronia)
common

V 3

04

Nemophanthus
common

V 4

05

Viburnum
common

V 2

06

Viburnum cassinoides
rare

stems weak, supported
on other plants, flowers white.
flowers yellow.

shrub; fruit immature.
shrub 3 m. tall; leaves
glaucous beneath.

Garrett Co.

shrub 2 m. tall

shrub 2.5 m. tall,
buds only.

shrub 3 m. tall; fruits
crimson, sweetish but
not very good.

shrub 2.5 m. tall;
fruit immature.

shrub 2 m. tall,

fruits immature.

shrub 3 m. tall; flowers
white.

shrub 2 m. tall, buds only.

168

1964 Maryland

45607

Alnus ~~incana~~ rugosa (DuRoi) Hb.~~common~~ abundant

08 (gran)

abundant under *Alnus*09 *Alnus ~~incana~~ rugosa* (DuRoi) Hb.

abundant

10 *Galium obtusifolium*
occasional11 *Dryopteris*
rare~~12 *Dryopteris thelypteris*~~
12 *Thelypteris palustris*
common13 *Arisaema triphyllum*
rare14 *Calla palustris*
locally common in water15 *Vaccinium corymbosum*
very common

169

shrub 3 m. tall; leaves
glaucous beneath.
— canes erect & strongly
ascending, single or
in small tufts; panicles
arching.shrub 3-4 m. tall, bark
rich brown, smooth
except for prominent
white lenticels; leaves
glaucous beneath.
— stems weak, erect,
flowers white 3-4
merous.

fronds erect, all sterile.

— leaves clear green
beneath.shrub 2 m. tall;
fruit immature

170

1964 Virginia

Labrus typus

July 3 - just n. of Spittler Knoll
overlooks on Skyline Drive

edge of woods.

45616

Tilia heterophylla Vent.

below

July 4 - Elk Wallow shelter
in oak-hickory woods✓ 1 17 *Circaea quadrisulcata* var. *canadensis* (L.) Harms
occasional✓ 2 18 *Lonicera canadensis*✓ 2 19 *Rubus occidentalis*
common
occasional✓ 1 20 *Bromus japonicus*
rare along trail✓ 1 21 *Cimicifuga racemosa*
common locally✓ 1 22 *Tilia americana*
occasional✓ 23 *Carex*
occasional✓ 1 24 *Dryopteris "spinulosa"*
in bottom of dry rocky ravine✓ 25 *Dryopteris marginalis*✓ 1 26 *Dennstaedtia punctilobula* (Michx.) Moore
occasional✓ 1 27 *Asarum canadense*
locally very common

Shenandoah National Park 171

tree 8 m. tall, leaves
notably white beneath.

flowers white.

flowers whitish.

primocanes erect,
floricanes procumbent;
- fruits turning black.
culms erecterect, to 1.5 m. tall, flowers
- foetid, white
young understory tree 8 m. tall.
sterile.fronds strongly ascending
from short erect rhizome.
fronds strongly ascending
from short erect rhizome,
under surface glaucous.
sterileall seen sterile. rhizome
with strong ginger odor.

172

1964 Virginia

45628

Festuca obtusa

3

occasional

1

29

Tilia americana v. *neglecta*

occasional

3

30

Dryopteris "spinulosa"

occasional

14

31

Galium triflorum var. *asprelliflorum*

common

12

32

Chasmodon

rare

16

33

Lindera benzoin

locally common on flat ground

5

34

Galium circaezans Michx.

very common

1

35

Viola pubescens Ait. var. *pubescens*

rare

5

36

July 4 Elk Wallow Picnic Ground

Cornus alternifolia

occasional in oak woods

July 4 - ~~just~~ Skyline Drivejust north of Brountown Valley overlook
in edge of mixed hardwood forest

3

37

Juglans cinerea

occasional

17

38

Ostrya virginiana

common

14

39

Tilia americana L.

occasional

Shenandoah Nat. Park 173

culms arching

sterile understory tree
7 m. tall.

fronds ascending.

prostrate

branched at base,
stems ~~erect~~ erect,

fruit immature.

shrub 3 m. tall, fruit
immature.

stems ascending.

shrub 3 m. tall (others seen
to 5 m.); fruit immature.

tree; fruit immature

tree 8 m. tall.

tree 20 m. tall; flowers
cream yellow, very
fragrant.

July 4 Fort Wyndham Rocks -
spectacular outcrop of
fine hard sandstone
with great cracks.
Tilia sp. heterophylla and
Betula lenta forest, rather
open. *Gaylussacia baccata*
so dry the ~~fls~~ infls. are
simply dried up.

July 5 - Lumberlost Trail
Thickets of *Alnus rugosa*
in old orchard, with apple,
crab apple, *Hamamelis*, etc.

In Lumberlost proper,
a good growth of moderate
size *Tsuga*, scattered
very large old oaks of several
kinds. Many decaying
stumps. Must have
been a magnificent
oak-chestnut forest,
but logged and *Tsuga*
came in. The large oaks
are those not worth cutting.

73 paces from beginning of
Lumberlost Trail at parking lot,
a chestnut sprout about 20' high,
8-10 cm diam. has a large blight
lesion on one side, a healed one on
other side. Beside this is a dead

stub about same size.
This sprout is beginning
to flower at top.

Big Meadows Swamp -
The open place in center
with buck bean ~~is~~ has
no water, even in holes.
Mud is still wet.

Spiraea flowering
abundantly.

At lower end the
stream is completely
dry. *Oenothera fruticosa*
has become much more
abundant than I have
seen before.

Chestnut + black oak n. of
Jeremy's Run Overlook

July 4 - Fort Wyndham
Rocks, north of Compton Gap
on great sandstone
boulders in mixed
hardwood forest.

45640

Ribes

X 6

common

3

41

Amelanchier

occasional

15

42

Lilia heterophylla

common

5

43

Betula lenta

common

X 6

44

Vitis aestivalis var. argentea (Mun.) Fern.

common, climbing

1

45

Gaylussacia baccata

local

3

46

Ribes

occasional

same - on rocky ground
around great sandstone
boulders in mixed
hardwood forest.

2

47

Lysimachia quadrifolia

local

5

48

Scutellaria ovata var.

local (also seen on
boulders)

5

49

Prunus virginiana

abundant

1

50

Aquilegia canadensis

occasional

depressed contorted
shrub, not spiny.

tree 15 m. tall, leaves
white beneath.

tree 10 m. tall, broken.

extensive vines,
leaves white beneath.
shrubs 0.7 m. tall,
suffering from drought,
almost wilted.

shrub 0.6 m. tall,
leaves dark green.

flowers yellow

stems decumbent
to ascending, flowers blue.

shrubs ~~up~~ to 3 m. tall

fruit immature,
erect; sepals and
sepal red, petal limb yellow.

178

1964 Virginia

45651 *Circaea quadrangulata* var.
canadensis (L.) (Hara)
common

52 *Smilax herbacea*
rare

July 5 - above Elk Wallow
shelter
along trail in oak-hickory
forest

53 *Juglans cinerea*
occasional

54 *Thalictrum*
common

55 *Leonurus cardiaca*
very local

56 *Oxalis corniculata* var.
common

57 *Geranium*
rare

58 *Oxalis corniculata* var. ^{florida Salicb. det. Senter}
rare

July 5 - just north of Jeremy's
Run Overlook, Skyline Drive.
in edge of hardwood forest

59 *Castanea dentata*

60 *Quercus velutina*
~~common~~ common

July 5 - Old Rag View Overlook

61 *Yucca smalliana*
single plant beside road

179

erect; flowers white,
stigma not deeply cleft.

leaves glaucous.
fruit immature.

tree 20 m. tall.

branched from base, erect,
flowers lavender.

erect, flowers yellow.
rhizome slender, horizontal.

~~flowers~~

sprouts ~~for~~ about 6 m.
tall, dead at top.
over 15 m. tall.

rosette with erect panicle
of white flowers, 1.5 m. tall.

July 5 - Milam's Gap
in brushy meadow

45662

Scrophularia

2

rare

12

63

Galium verum L.

dense colony 5 m. across

July 5 Big Meadows Swamp

16

64

*Oenothera*very common in lower
end of desiccating sphagnum bogsame - in open ^{central} part of swamp

13

65

Osmunda regalis

rare

12

66

Arisaema stewardsonii

rare

2

67

Onoclea sensibilis

very common

same - in drainage ditch

13

68

(grass)

occasional

July 5 - Big Meadows Camp Ground

13

69

Cerastium

along path

erect, corolla dark
bronzes, a brownish maroon.
stems erect from
matted buried rhizomes,
buds yellow.

flowers bright yellow,
open but fading at 3:30 p.m.

fronds erect, in dense clump

spathe strongly fluted
without, flutings white,
rest of spathe green except
blackish-maroon stripes
within corresponding to
areas between flutings,
spadix pale green.

erect clump.

petals white, bifid.

July 5 - Big Meadows picnic ground
in open woodland

45670 *Dianthus armeria*
very common

71 *Dianthus armeria*
rare, with pink form

July 5 - Trail to Timberlost,
Shyline Drive
In semi-open level
ground

72 *Lilium heterophyllum* Vent.
shaded

73 *Crataegus*
common

74 (grass)
common along trail in shade

75 *Oxalis*
common

76 *Alnus rugosa* (DuRoi) Lfr.
locally common, forming
thickets

77 *Ribes*
occasional

78 *Ilex montana*
rare

79 *Lysimachia quadrifolia*
common

flowers deep crimson-
pink.

flowers white.

young tree 10 m. tall,
sterile

densely branched shrub
3 m. tall; fruit green.

large shrubs or small trees
to 5-6 m. tall, bark rich
brown with conspicuous
pale lenticels; leaves
bluish green beneath.

shrub 0.8 m. tall,

fruit green.

shrub 3 m. tall;

fruit immature.
flowers yellow.

184

1964 Virginia

July 12 - Sleepy Hollow
in small thicket on
roadside.

45680

Acer cf. saccharinum

~~canadensis~~

12

81

Acer ginnala

July 19 - Sleepy Hollow
in wooded yard,
common in openings

12

82

Opalis

14

83

Opalis

Fairfax Co.

185

shrub 3 m tall sterile;
leaves very glaucous beneath.
shrub 1.2 m. tall
leaves green beneath

erect, flowers yellow
erect, flowers yellow.

186

187

✓44303

~~44341~~

✓45375

✓45490

✓45492

✓45496

✓45528

~~45554~~

✓45656

✓45658

✓45675

~~45682~~

~~45783~~

✓73
✓45-215
✓45-215



2039 K Street, N.W.
Washington, D. C. 20036



Dr. F. Raymond Fosberg
212 Holmes Run Road
Falls Church, Virginia

✓44303

~~44341~~

✓45375

✓45490

✓45492

✓45496

✓45528

~~45554~~

✓45656

✓45658

✓45675

~~45682~~

~~45683~~

Office Memorandum • UNITED STATES GOVERNMENT

TO : Dr. C. R. Benjamin
Div. of Mycology

DATE: June 14, 1964

FROM : F. R. Fosberg

SUBJECT: Identity of fungus.

Enclosed is an extraordinary mushroom that I found in an area that the Nature Conservancy is planning to preserve for future scientific study. One of the first needs is an inventory of the plants and animals.

Could you please take a look at this thing and, if possible, send me its name (also the family). You can send the name to me,
care of National Research Council

Stop 44

by governemtn messenger service.

Thank you,

FIELDTRIP

May 14

Leaders: FOLDATS, E.
VARESCHI, V.

Maracay (6.30 a.m.) - Encrucijada (Breakfast) - San Juan de los Morros -
San Sebastian - Observation stop - San Casimiro - Santa Teresa - ~~Cauacagua~~ -
Observation stop - San José de Rio Chico - Puerto Píritu (Lunch) -
La Ceiba (Observation stop) - El Tejero (Observation stop) - Josepin
(Night).

Observations: ant opic savannas
flooded savannas
savanna on sandy soils (Monagas)

Dr. Howard E. Weaver

605 E. Florida Ave. Urbana, Ill.

asst. Prof. Dept. of Recreation
U of Ill.

73
Begin # 45-215

